ABSTRACT
            This analysis, a review of literature and experience
on performance-based education, is divided into nine chapters:
chapter one, "The Short Form: Best-Guess Working Hypotheses for
Competency-Based Education" (a summary of the frame of reference for
this study and the recommendations for performance-based education
which resulted from the effort); chapter two, "Performance-Based
Education: Overview and Definitions"; chapter three, Origins: Where
Did Competency-Based Education Come From?" (a brief history of its
development in military training, cybernetic psychology, programs for
children, and applications to teacher education); chapter four,
"Innovation and Competency-Based Teacher Education"; chapter five,
"The Bureau of Research Models: The Application of the Systems
Approach"; chapter six, "The Model of the Teacher: Is a Generalist a
Set of specialists?" chapter seven, "The National Teaching Style: The
Target of Teacher Education" (a brief analysis of the objective
studies of teaching); chapter eight, "What Would Be the Nature of a
Comprehensive, Competency-Based Teacher Education Program?" and
chapter nine, "What Would Be the Nature of a Competency-Based Teacher
Center?" The appendix, "The Enormous Software Problem," consists of a
review of available performance-based teacher education materials.
The appendix is divided into seven sections. (Author/JA)

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The Promise of Performance

(Competency)-Based Education:An

Analytical Review of Literature and.

Experience

by Bruce R. Joyce

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HEALTH, EDUCATION, AND WELFARE

Office of Education

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This report was prepared during the late summer of 1971 with the assistance of many people from Teachers College, especially Marsha Weil and Rhoada Wald, and my colleagues in New London, Pennsylvania, Betsy Joyce and Jean Botts.

Most of Chapter Five consists of material prepared under Grant No. OEG-070-4726 and the Appendix consists of materials prepared under a contract with the National Teacher Corps. The remainder of the material was entirely prepared during this study.

Because of the large size of the literature reviewed, the bibliography has been divided into seven sections, each numbered consecutively. References are given in terms of a letter (A-G) referring to the section, and a number referring to the entry. Hence, a reference designated as B-4 would refer to section B of the bibliography, the fourth entry.

New London, Pa.
Labor Day, 1971

BIBLIOGRAPHIES

Chapter One

The Short Form: Best-Guess Working Hypotheses

for Competency-Based Education

by

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Given the confusion that attends the development and
publicization of any fad or trend, how do we get perspective
on it, determine its worth, decide how to use it, and shape
it for maximized payoff?

The case of competency-based education is not unique
in the history of educational trends except that it is more
technical than any previous general movement in education,
and it represents an attempt to manage education (bring
it under the direct control of the policy-maker) more than
to influence its goals or methodology.

Definitions (See Chapter Two)

Management is the watchword of competency-based
education. It assumes that one can have clearly defined
educational goals, relate them to precise and direct means,
and monitor the process so as to determine its effects and
revise the program intelligently. The competency-based stance
includes behaviorism--the practice of defining human capacity

in terms of observable behavior. It includes a preference
for direct educational methods--those that achieve changes
in behavior by inducing the client to practice the new
pattern. Even more characteristic is the stance that complex
functionaries (as teachers, military commanders, quarter-
backs) can be conceptualized as a system of related
behaviors (a model) related to an environment (a system of
sub-systems) and that this model can be analyzed into
component behavior-streams which can be developed by direct
training procedures.

Competency-based education of teachers is the stance
that the teacher can be conceptualized as a system of
observable behaviors which can be directly trained and
assessed.

History (See Chapter Three)

Military training needs in the Second World War and
after resulted in the rise of very pragmatic procedures for
designing training systems which employed extremely direct
methods and precise assessment measures employed at
frequent intervals to relatively short training units.
Training psychology proved to be effective in preparing
persons to fill a wide variety of complex roles to demanding
standards under conditions of stress.

Cybernetic psychology added the practice of conceptualizing human operations as models of communication and information-processing systems operating as sub-systems of a complex environment. The process of conceptualizing human roles in terms of models operating within model environments gave rise to the creation of simulators as training devices which combined the advantages of realism (high transferability) and control of task complexity (high sequenceability) in the design of training systems.

Experience in public education has been largely linked to technological innovation. Language laboratories, programmed instruction, television systems, and I.P.I. have all been applications of the competency stance which have had positive results. (A)

Experience in teacher education has largely been technology or product-linked also. The work by Allen and associates, Flanders and associates, Cruickshank, Dodd, Cooper, Kersh, Davis, (D) and others has produced positive results with respect to the teaching of teaching skills. The recent work of Joyce, Weil, Wald, and Gullion has provided evidence that it is possible to train teachers to employ a variety of complex models of teaching which are strikingly different from normal classroom behavior.

The Bureau of Research Teacher Education Project pro-vided application of the stance to the systematic planning of teacher education programs. The results of the effort suggest that the competency-oriented stance embraces a wide variety of approaches to the conceptualization of the teacher and strategies for his training. (See Chapter Five)

The systems planners, in attempting to conceptualize the teacher and his training, operated in accordance with the findings of the recent reform movements in public education--that it takes a convergence of changes, in technology, staff-utilization and training, and curriculum, accompanied by strong leadership, to bring about more than a fleeting change in an educational institution.

The systems planners also followed steps which represent the state-of-the art in the field, steps which constitute the process of planning competency-based teacher education.

The Process

1. The creation of a "working model" of the teacher, described as interrelated sets of competencies and as a subsystem of the relevant larger environment in which the teacher works (teams, schools, communities, support systems, etc.). The model must "really work." A collection of competencies

that do not fit together into an effective performance model is _not_ an adequate program objective.

2. The analysis of this model into streams of related competencies that can form the basis of components of the training system.

3. The selection of component strategies and the development of specifications for components.

4. The creation of the overall training system, especially interlocking relationships among components, support systems, and communication systems.

5. The organization of management systems to monitor progress, program elements, and program testing and revision.

6. The reconciliation of the program with the client (student) and the field (educational system). (This is not a step to be done _after_ the others, but must be accomplished in various ways which are synchronized to the other steps.)

The result of these steps is a modular training system whose elements can be matched to the achievement profile and characteristics of the teacher candidates.

The precision in training which results from this process should be very high. The reason for this can be seen by focusing on three characteristics of the resultant program:

1. A storage and retrieval system of assessment
   elements which can be used to obtain a precise
   estimate of candidate competence and progress.
2. A storage and retrieval system of behavioral
   competency descriptions matched with program
   elements (modular) for achieving them.
3. A management system for relating (1) and (2)
   so that training can be closely matched to
   candidate needs.

These same features provide the potential for a very
high degree of program individualization and personalization.

The implementation of such a program depends on the
development of a vast quantity of software. Competencies
have to be specified (the Bureau of Research projects each
contained 2,500 or more with much remaining to be done).
Instructional materials have to be created (the largest
bulk job). Assessment devices and a management support
material have to be prepared. (See Appendix)

Without the production of high-quality software there
will be no competency-based teacher education. This point
should not be minimized. If it is not taken seriously, the
following dilemmas will develop:

1. The creation of competency-based certification
    standards without the capacity to assess adequately
    or remedy a deficiency once it is found. (Several
    states are currently heading straight into this
    dilemma.)

2. The placing of the teacher in a position where he
    is expected to be competent but has no training
    reservoir to turn to to improve himself. (Some
    forms of the accountability movement are creating
    this dilemma by pressuring the teacher to show
    pupil achievement gains but not providing precise
    training for him so he can increase his capacity.)

A comprehensive training program which links the
preservice and inservice levels is necessary to assure both
continuous assessment and equal ability to meet training
needs. (See Chapter Eight)

Teacher Centers (See Chapter Nine)

If the systems-planning technology described above is
applied to the development of a "teacher center" it will
have the following characteristics:

1. A description of one or more models of the teacher
    broken down into related sets of competencies.

2. A modular training training system related to
    those competencies.

3. A diagnostic system which enables the teacher to
    compare his performance with the modeled behavior
    and determine areas of strength and weakness.

4. A management system which permits the teacher to
    relate himself to the training system in light of
    the diagnosis.

5. A linkage to schools which permits the teaching
    center to function so as to: (a) improve the
    present mode of operation of the schools or
    (b) to mesh with changes in curriculum, staff-
    utilization, and preferred models of teaching to
    bring about a new educational environment.

There is considerable evidence that the convergence of
forces identified in 5a and 5b is requisite to training
effectiveness. One cannot successfully train a teacher to
one model and then give him a job which demands another or
inhibits the performance of the one. Nor, conversely, can
one bring about innovation without including performance-
based training of the teacher as one of the main thrusts
of energy. (See Chapters Four, Six, and Seven).

As in the case of a comprehensive competency-based
teacher education program, a teacher center is dependent on
the development of software to permit implementation of
diagnosis, training, and management. Without software,
a teacher center will not differ appreciably from the inservice
workshops of the past.

The Direction of Education

Because the creation of competency-based teacher education
programs and teacher centers is an expensive process and,
probably more important, because it promises to be powerful
provided it is accompanied by changes in staff-utilization,
curriculum, and materials of instruction, it must be aimed
carefully.

Increasingly, software is being developed. See:
Materials for Modules, appended.

As far as we now know, competency-based education can
be applied to a wide variety of quite different conceptions
of the teacher. (See Chapters Five and Six)

Apparently, then, the designer of a competency-based
teacher education program can choose one or more from the
available models of teaching that reflect differing
educational theories. Will one choose the teacher of
Carl Rogers, B. F. Skinner, John Dewey, John Holt, A. S. Neill,
David Ausubel or—who?

The selection of the model constitutes an explicit
selection of an educational stance, for the teacher's behavior
gives life to one or more of the possible modes of education,
and the choice among them should be a conscious one.

The Generalists As a Set of Specialists

A related choice involves the question, "Can we train a general functionary called a teacher or does each educational model require a new set of competencies?" My view is that the soundest procedure at present is to view each model of the teacher as unique and to train for specialized models rather than for generalized competency. The generalist of the past has had great difficulty adapting to new models of education-- he has been unable to implement innovative teaching strategies and technologies. Thus it seems best for the present to conceive of a generalized model as a set of specialized models and to define competence in terms of specific educational practices. (See Chapter Six)

Chapter Two

Performance-Based Education: Overview and Definitions

Whenever a new trend begins to establish itself in a
field like education, it generally happens that a few
slogans become established in the public consciousness,
and the trend becomes known by those slogans. Our present
subject is "Performance-Based" or "Competency-Based"
education, especially as it applies to the training of
professional educators. As in the case of other trends,
the slogans have rapidly acquired many meanings, and it is
necessary for us to establish a definition which will embrace
the current usages sufficiently to allow us to unify the
literature and, at the same time, be precise enough to permit
us to identify working concepts that can be acted on in the
real world.

As contrasted with other stances toward education,
performance-based and competency-based education have in
common their espousal of direct and definite ends and means
rather than general, indirect or indefinite ends and means.
At the elementary and secondary school levels, Popham's (E-95)
study of teachers' ability to identify behavioral objectives
dramatizes the issue. Popham asked a large quantity of
teachers to distinguish between objectives which were more

or less behavioral according to the definitions of
behaviorality commonly used by social scientists. He found
that many of the teachers were unable to distinguish
behavioral from nonbehavioral objectives; and when he com-
pared them with a random group of citizens, the citizens,
untrained in education, were at least as good as the teachers
and, in some cases, better at identifying behavioral
objectives. Do Popham's findings mean that teachers cannot
engage in an act which we might call teaching? Probably
not, although some might argue the point. What it means is
that teachers, generally speaking, use general and indirect
methods which are not precisely aimed toward specific goals.
They are not, in other words, engaged in competency-based
education.

Given the general mode of operation of most schools,
this should not be surprising because most instruction in
schools is group instruction. When one becomes precise in
setting and achieving behavioral objectives, he very
quickly becomes dissatisfied with group instruction because
very few individuals in a group are "ready" for any given
instructional objective at the same time. The more
precise one becomes, the less satisfactory group instruction
in self-contained classrooms or departmentalized organizations
becomes. Consequently, when one becomes much more specific

about what one wants to achieve and how he wants to go about
it, one begins to define very specifically the competencies
or performances he wants the student to manifest, and he
tends to devise instructional support systems that make it
possible to individualize instruction. To this date, the
Individually Prescribed Instruction system developed at the
University of Pittsburgh Research and Development Center is
the most prominent example of a competency-based curriculum
developed for the public schools. I.P.I., as presently
constituted, consists of instructional systems in reading
and arithmetic--each system containing thousands of
instructional units or modules, each one related to a
particular instructional objective and an overall system
related to a diagnostic and evaluation system which permits
a precise tracking of the progress of whatever number of
individuals are relating to the system.

In contrasting the teacher using general methods
aimed at general objectives with the instructional system
comprised of very specific and definite methodologies
directed at very specific and clearly-defined objectives,
we find the essence of the nature of competency-based
instruction as it is distinguished from more familiar
forms of teaching.

It should not be assumed, however, that performance-
based or competency-based instruction cannot take place
in groups. For the reasons mentioned before, a competency-
based education is more than likely to consider the merits
of individualization, but precision of methods and
objectives is the hallmark not a strategy of individuali-
zation qua such.

Precision and Teacher Education

We can make the same distinction at the higher
education level between general aims and general methodologies
and specific aims and specific methodologies. For most of
this century, teacher education has consisted of general
means: courses in the foundation of education, educational
psychology, methodology, and apprenticeship or student
teaching; and these have been aimed at general goals. The
student was generally not taught specifically how to use a
learning theory to solve its instructional problems, but
rather there was a belief that if the teacher knew a good
bit about learning theories that these would aid him as he
came to try to solve instructional problems in the classroom.
General knowledge of learning theories would be part of
his available equipment for problem solving. Similarly,
his knowledge of educational philosophy gained in the social

foundations courses would help him comprehend more fully
what he was about and understand his historical position.
No one would, however, expect that a student would use an
element of educational philosophy in a particular way with
a particular learner in a particular classroom. Educators
who are oriented toward the competency stance, however, wish
to make the business of teacher education a great deal more
precise than that. They hope to make a systematic analysis
of the particular behaviors that a teacher will need in
order to solve his problems and then to provide him with
a specific and specialized training to enable him to
arrive at those competencies and to use systematic
evaluation devices to determine his ability to manifest
those behaviors under realistic conditions.

The characteristics of the Bureau of Research
Teacher Education Program models for teacher education (6)
illustrate that to apply precision to the definition of a
complex functionary like a teacher is in itself a complex
process. The "systems models," when fully complete, can
be expected to have upwards of 3,000 behavioral objectives
in each one of them, each objective describing a particular
competency of the teacher.

From my perspective, therefore, the distinguishing
characteristic of competency-based training is precision
in ends and means and, therefore, comprehensiveness and
specificity in planning all aspects of the educational
program. The competency stance is <u>not</u> the possession of
a particular belief in a particular <u>kind</u> of teacher as the
goal of the teacher education program. A person can be
competency-oriented and embrace any type of end and any
type of means so long as those can be precisely planned.
He _∧uses the tools of the positivist∧to make his ends and
means clear. If it eventually turns out that to embrace
positivism requires the rejection of certain kinds of
educational means, then the competency-oriented educational
planner will indeed limit his repertory somewhat. I see
no evidence of this at this time, however. Sensitivity
trainers, Rogerian psychologists, Freudians, inquiry
trainers, and behavior modification advocates all seem
apparently able to live under the roof of competency-
based education.(F)

If I am not mistaken in this, it means that quite
a large number of types of conception of the teacher and
ways of training him can be developed under the rubric
of competency-based education. The components of the

systems models lend support to this notion in the wide range
of component types that were included among them. Gestalt
therapy techniques were applied in the Massachusetts Model
to the development of human relations skills and a more
adequate self-conception on the part of the teacher. The
Syracuse Model included sensitivity training and reflective
counseling techniques. The Northwest Regional Laboratory (G-s)
employed simulation extensively. The models represented, in
fact, a much greater diversity of training methods than
are employed in present-day teacher education programs.

Thus we can accept, for the time being, the notion
that systematic performance-oriented conceptions of teacher
education can subsume a very wide variety of types.

Probably the same thing is true of the education of
young children, although the range of developed approaches
has by no means been as exhaustive as we might imagine. Thus
far, I.P.I. has been applied to reading and to arithmetic,
and there are some plans to apply it to the social studies
area as well. Language laboratories have for years been
performance-oriented and have been organized according to
behavioral ladders of achievement in terms of competency to
speak the language. Programmed human relations courses are

now available for secondary schools. The Tri-University Project
at the University of Washington has attempted to develop social
studies competencies for children in a form that can be used to
guide systematic, systems-based curriculum development in that
area.

At any rate, if we make the assumption that the performance-
oriented stance is a relatively value-free technology with respect
to the ends and means of education which can be related to it,
we can ask the most stringent series of questions about its
nature, about the evidence concerning the effects of using it,
and consider how it can be used to create a wide variety of types
of education for children and teachers alike.

battle, or transport where pilot competence was crucial.
On him depended the safety of the crew and the airplane
and the success of the missions which were to be flown.
A second condition was that these personnel had to be
trained very rapidly. Especially at the beginning of the
Second World War there were very few qualified people in
existence, and large numbers were needed very rapidly in
the face of a deteriorating war situation.

These needs (precision and speed) of military training
contrast radically with the needs of most educational
institutions. Up to that point, universities and schools
had been leisurely and general, for the most part. Most
educators and psychologists who had been concerned directly
with education focused on the problems of the individual
learner and his affective responses to training. Thus
they tended to focus on educational strategies which gave
the student an opportunity to develop himself on his own
terms and which paid maximum attention to his need structures
and his emotional responses to the training that he was to
undergo. Thus most of the fairly well-developed teaching
strategies up to about 1940, with the exception of operant
conditioning (which had not been applied widely to education)
were fairly indirect, general methods which presented a very
soft face to the learner so as not to control him overly.
The basic methods of the Progressive Movement, (Cremin, 1951)(E-27)

for example, gave the learner considerable opportunity to
develop himself by sharing in the creation of his own
educational goals and means. This method was leisurely
and general and was not calculated to achieve specific
outcomealy focused training. Similarly, the methods which
developed out of the Child Study Movement paid considerable
attention to the way the learner felt about himself, were
concerned with facilitating his personal growth, and,
as in the case of the progressive methods, gave him his
maximum opportunity to develop himself.

The urgency of war conditions took attention away from
the needs of the learner and toward the need for precise
and rapid training which considered the learner chiefly
in terms of his capacity to respond to the training and his
ability to hold himself together during a rather arduous
training process. The psychologists who created the
training systems soon came to believe that much of what
had been learned from psychology was of very little use when
it came to developing a training system.

Gagne's famous essay was very direct on this point. (Gagne, 434)
It instituted a plea, advocation of the rough parodigm that
came to characterize activities of the trainers. Essentially
this scheme, which is paraphrased below, was arrived at by
teams of people who worked on widely different types of
training programs but which faced the same problems of the

need for a rapid training system to yield fairly certain
results or recycle or reassign the trainee if progress was
not being made. The four steps are:

1. The identification of the program goal in terms
   of sets of specific behavioral elements which fit
   together to define the competency of the trainee
   at the end of the training program. (When this is
   applied to the education of the teacher, we refer
   to the goal as the "model" of the teacher.) (Joyce, 1971)(F)
   For example, the task of the pilot is defined in
   very specific, interrelated behavior streams even
   though very complex operations are involved.
   Specificity and relatedness of behavioral elements
   are essential.

2. The organization of these behavioral elements
   into coherent units or groups which could form
   sequenced streams for training. Again in the
   case of the pilot, some of his activities involve
   communication to other members of his air crew.
   Yet others involve communication to the aircraft
   and the ground-control systems. Still others
   include navigation. All these are in addition to
   the complex skills related to the flying of the
   aircraft, the preparation for operations such as
   bombing and the like. Each of these complexes of

activities can form behavior streams consisting of
sequences of behaviors leading from those which
are simple to more complex ones. The later,
complex performance is thus dependent on the
acquisition of prior skills and knowledges.

3. The development of training exercises which
could be matched to each of the behaviors in each
stream. Sometimes this involves the development
of a general setting in which a sequence of skills
can be taught--such as the pilot simulator which
enabled the practice of skills ranging from
communicating with ground control, starting the
engines of the aircraft, through to flight con-
ditions including combat problems. At other
times the exercises are simple and discreet,
including programmed tasks and simple exercises.

4. Creating the evaluation system. Related to each
training exercise is an evaluation device,
preferably administered immediately after or
imbedded within the training task, to determine
whether the behaviors were acquired and to provide
immediate feedback to the trainee or the instructor,
achievement of the skills. This is one of the
critical steps in developing a training system
and one which differentiates it most dramatically
from indirect training methods.

For contrast, let us imagine a teacher in 1942
attempting to teach children how to relate to each
other more democratically in making decisions. The
teacher might carry on activities with the children
in which they would define goals, set procedures,
and carry them out. What the teacher would very,
very rarely do, so rarely that it was almost a
momentous event in the classroom, would be to pro-
vide immediate feedback to the students about each
element involved in setting mutual objectives and
procedures. Teacher and students might have a
general evaluation from time to time or a dis-
cussion over how things were going.

In a training system feedback would be handled
much differently. The pilot who is learning to
operate an aircraft might be in a situation, say
at the early stages of training, which required him
to simulate a call to a control tower asking for
permission to take off. If he did not do this
correctly, he would get immediate feedback and
correction and further training. If he did not
make progress toward these or other goals, he
would be dropped from the program or recycled so
he could begin with another group of flight cadets

and go through the whole training program from the
beginning. The feedback ensures mastery of tasks
which, while often very simple in themselves,
would be very critical to the eventual performance
of the terminal task.

The training psychologist was very much con-
cerned to see that all the behaviors within each
behavioral stream were mastered with relative
certainty so that after a trainee had passed a
given point in the training program, he could know at
once what he had been able to do and for what he
had the prerequisite skills in terms of later
training.

5. The prior steps lead quite naturally to the develop-
ment of a managed program in which evaluation is
monitored by a system which can determine progress
of all trainees, strengthen weaknesses of particular
aspects of programs, and so on.

The importance of evaluation systems explains
why training psychologists adopted the practice of
stating behavioral objectives in measurement terms,
even using sample test items as exemplars of the
specific behaviors which would be required to
complete a training unit or module. It does not

help the trainer to have a behavioral objective
defined precisely if the measurement is not
included and one can determine whether the behavior
has been achieved. In other words, the particular
positivistic convention that became established was
to state objectives always in precise terms that
specified the conditions under which they might be
measured. Whether this is necessary for all
education is not clear, but in the urgency of
crash-training programs, it is quite understandable
and seems so obvious that questioning it has not
been done frequently or with any great thoroughness
although the practice has been severely criticized. (A-3).

Many of the personnel who have worked in the education
industry, in educational measurement, and in curriculum since
the Second World War have been involved in or were influenced
by the experience of the training psychologist and have come
to adopt the "measurement way" of stating objectives. See
the following for example, which is taken from one of the
IPI behavioral streams for Reading.

In the present concern for accountability in education, it is natural that it is to training psychology procedures that educators should turn. If the competencies of the teacher can be defined in measurement terms, then we can hold trainers of teachers accountable and certify them in terms of a measurable performance. On the other hand, if we speak of certification in terms of the accumulation of credits in education courses and hours of practice teaching experience, we have no way of telling what was learned through those experiences and no way of holding people accountable if the teacher is unable to perform satisfactorily. Thus it is that companies such as Systems' Development Corporation and research and development centers such as those in Pittsburgh and Los Angeles which have experience in the application of training psychology procedures to educational planning have come to take an important place recently in the development of teacher training procedures, procedures for the teaching of reading, and in other areas where it is desired to have a high degree of control over the outcome of education.

As systems planning has become more fully developed, the practice of stating objectives in terms of measurable outcomes has become more fully developed. The Bureau of Research Teacher Education Project reflects this totally for there

were no exceptions among its teams to the belief that if an
objective could be stated precisely, a way of measuring it
could be devised.

Cybernetic Psychology

It is very difficult to tell where training psychology
ends and cybernetic psychology begins, and it probably would
not even be productive to make the distinction except that
it underlines a particularly important development that
occurred between 1940 and the present, a way of thinking
about learner and a training system development so
important that no understanding of competency-based edu-
cation can be made without apprehending it. (Smith and Smith, *N-77*)

If we conceive of a person as an automatic, self-
regulating, information processing system and liken it to
an electronics communication system which is capable of
receiving information from the environment and modifying its
own behavior to become more effective in its environment, we
get a picture of a computer connected to its environment by
sensors. This machine processes information on its own
behavior (as that behavior relates to the environment) and
learns by experience.

If we take this a step further and suggest that an
environment be built which facilitates the effectiveness

with which these sensors can detect the performance of the
individual in its environment (if, in other words, we build
a machine designed to fit very closely the requirements of
the human machine), we can conceive of developing training
systems made up of tailored environments and training tasks
which lead the student to practice new skills and improve
his performance by responding to feedback to his behavior.

It is out of this kind of machine--one built to fit the
requirements of the human one that we have the development
of cybernetic psychology and its most common application
to education, simulated systems designed for training
purposes.

Let us at once proceed to examine this in terms of
the training of the teacher. Student teaching and methods
courses have been the common methods for training the
teacher. Suppose that we want to teach Behavior "A" to
a teacher. Suppose that that behavior is the capacity to
employ advance organizers in teaching. (E-13) An advance
organizer is a generalization which provides a conceptual
anchor for material that is to be presented to students.
In the ordinary circumstances of teacher training, the idea
of an advance organizer and how it might be used would be
presented to the teacher candidate either in a methods
course or an educational psychology course. Let us suppose

that this has been efficiently accomplished, that the teacher
candidate knows what an advance organizer is and knows how
to facilitate the mastery of material to be presented verbally
to the learner.

The teacher candidate, in the course of his practice
teaching, may or may not have an opportunity to practice
using advance organizers for determining their effect on
learners. His cooperating teacher may assign him to
instructional situations where organizers are not appropriate
or give him instructional methods which are not compatible
with the use of organizers. It may be some time then, if
ever, before a trainee has an opportunity to practice using
them, but let us suppose that he does find an opportunity
within a few weeks of being taught what an organizer is and
how it might be employed. The chances are that no one in
his environment can reflect with him on his experience. Did
he actually use an organizer? Was it appropriate to the
verbal material? Did it have a positive effect on the
learners? These questions he has to cope with by himself
with very little assistance. Now if he is an extremely
assiduous learner, he may not only have mastered the idea,
but he may figure out a way of conducting an experiment in
which he can get this information for himself, but it is
quite a task to do so, and we would not expect him to be

able to do this with respect to very many ideas.

Now, let us suppose we take a cybernetic stance toward
the same problem. Let us build a teaching laboratory in
which our teacher candidate can be presented with an
instructional system or with a seminar or lecture or series
of readings designed to teach him what an advance organizer
is and how it can be used. Let us provide him in the
teaching laboratory with a small group of learners with
whom he can immediately try out what he has learned. Let
us further provide him with observers who can consult with
him about the nature of his organizer and help him com-
pare his procedures with those that others have used in
similar circumstances. As he teaches, let us provide
observers who can analyze his behavior and feed that back
to him. In addition, let us help him construct measures
to determine whether the organizer functioned for the
children. In his environment, he receives a tremendous
amount of feedback about his knowledge of organizers, his
ability to construct them, his ability to present them to
children, and the effects that they had on those children.
He is then in a position to correct his own behavior, to
modify what he is doing according to criteria related to the
learning that he was supposed to be acquiring.

Although we have yet to see the application of simulation within a systematic teacher training program which provides an optimal series of teaching laboratories in which full effects of simulated training can be felt, there are some simulations in present use. Teaching simulations such as Cruickshank's,[G-8] Joyce's[G-9] and Kersh's[G-4] and, to some extent, micro-teaching[D-3] are designed to control the training situation so that there can be a focus on specific kinds of behaviors to be acquired by the teacher candidate, but in an environment which simulates reality. That is,, his behaving is under conditions analogous to those under which he will eventually teach.

People wonder at once whether a complex activity such as teaching is amenable to cybernetic psychology, which tends to simplify reality in order to make it easier for the learner's information processing system to operate effectively when he tries to acquire specific behaviors. Thus far there is no empirical evidence on this question, but the existence of very complex simulators to train functionaries such as submarine captains and battalion tank commanders indicates that the applicability is there.[C-23] The submarine trainer, for example, puts the captain and his crew into conditions in which they communicate with the world only through sonar, radio or their periscope. The

simulation is so elaborate that they can navigate their submarine, be attacked by the surface vessels, engage in evasive action, see feedback in terms of whether that evasive action was likely successful or not, and can repeat the encounter in order to modify their behavior and learn behavior which would be judged to be effective in the situation. (ℳ-ϕ)

If critical, complex warlike situations can be simulated effectively in the development of cybernetic trainers, it seems reasonable to suppose that the relatively more tame environment of the classroom can be simulated with a realism to be effective for training purposes.

The Empirical History of Competency-Based Training in Teacher Education

The history of experiments in competency-based training in teacher education is scattered and somewhat difficult to pull together. Evidence of effectiveness is so far quite sparse.

Nearly all of the accumulated evidence has come from the specific experiments to test the effectiveness of products or specific procedures for changing teacher behavior in minor ways. We shall treat this literature in terms of the general question. Can direct training methods influence

the behavior of the teacher and what kind of training
procedures appear to be most effective?

The "Micro-Teaching" Complex

A series of instructional systems have been developed
using explanation, televised demonstration and television
playback to provide practice and feedback to the teacher
about his behavior. A surprising proportion of this work
has related to the "micro-teaching" experiments, developed
by Allen and his colleagues at Stanford University. (P.3)
The work reported by Allen, Fortune, Acheson, Schmuck,
Olivero, Ryan and others either through television or through
written descriptions and then practiced the behavior with
small groups of children, teaching and reteaching until the
behavior was mastered. It seems clear that such instructional
procedures can indeed result in changed teacher capacity
to perform at least in the "micro-teaching" situation,
and there are several studies indicating long-term effects
in relation to pupil response to the teacher. Acheson's
study indicated that there is evidence that the television
model alone unaccompanied by a written model does not provide
the teacher with the theoretical understanding necessary to
carry out the behaviors but that the written model alone is
definitely insufficient.

The Far West Laboratory has developed a series of
instructional systems employing micro-teaching called

"mini-courses" and these have been submitted to extensive
field tests. These have been created to teach a variety of
teaching skills including some fairly complex ones. Borg
and his associates have been careful in their research, and
there appears very little question about their ability to
use straightforward developmental procedures to create
mini-courses and similar instructional systems which have
the capacity to teach teachers a considerable variety of
teaching skills. $(D-i?)$

The Interaction Analysis Complex

Flanders, Amidon, and their associates have produced
a considerable number of studies in which they have attempted
to change teacher behavior by teaching teachers systems for
studying their teaching. Particularly they have used the
system called Interaction Analysis which is a device for
coding teacher and student communications in terms of several
categories which dimensionalize teaching as direct or
indirect. In most of their studies teachers have been taught
how to study their teaching using the Interaction Analysis
System, and then they have studied their teaching and
attempted to modify their behavior depending on what they
have discovered. $(D-5, 3.5)$

While the evidence is somewhat mixed, it does appear
that teachers have changed their behavior somewhat as a

result of Interaction Analysis feedback and that student
teachers who learn to study their teaching using an
Interaction Analysis system develop less direct patterns
of behavior than do student teachers who are not exposed
to it. The following chart summarizes their research.

TABLE 11-1
Projects Using Interaction Analysis to Help Modify Teaching Behavior Which
Include Evidence of Program Effectiveness

Collect Data	Publish Results	Author(s) and Reference Number	Location
	Date		
Presrvice Programs for College Students			
1963	1964	Hough and Amidon (53)	Temple University
1963	1965	Zahn (108)	Glassboro State College (N. J.)
1964	1965	Kirk (59)	Temple University
1964	1965	Furst (44)	Temple University
1964	1965	McLoed (64)	Cornell University
1965	1966	Hough and Ober (54)	Ohio State University
1966	1966	Lohman, Ober, and Hough (61)	Ohio State University
1966	1967	Finske (31)	St. Mary's College, Notre Dame
1966	1967	Moskowitz (71)	Temple University
1968	1968	Borg, et al. (16)	California
1968	1969	Bondi (14)	Florida State University
Inservice Programs in Field Settings			
1960	1961	Bowers and Soar (18)	North Carolina
1960	1963	Flanders (36)	Minnesota
1962-64	1966	Soar (93)	Pennsylvania
1965	1966	Hill (51)	Ohio State University
1966	1967	Emmer (28)	Michigan
1967	1968	Jeffs, et al. (56)	Las Vegas, Nevada
1968	1968	Borg, et al. (15)	California

(Taken from p. 351 of D-35)

Teachers apparently have become somewhat more flexible
in their behavior as a result of Interaction Analysis and
their patterns of teaching appear to become somewhat more
responsive to pupil ideas.

One of the mini-courses developed by Borg and his
associates was designed to teach the Flanders system of
Interaction Analysis to teachers. The results were more
positive than in any other of the Interaction Analysis
feedback studies.(7/8) The teachers changed on eleven of
thirteen measures with particularly strong changes in the
proportion of teacher talk in relation to pupil talk.

The research is partial and has not always been
cumulative, but Flanders, Amidon, Hough and their associates
have provided evidence that permits us to conclude that
when teachers are taught how to study teaching using
Interaction Analysis systems that modifications in their
behavior can be made in predicted directions. The state of
the research indicates that Interaction Analysis instructional
systems can by no means be concluded to be a powerful
teacher training technique in terms of their present state
of implementation, but there seems strong support for the
notion that it is a potentially very powerful technique if
applied in the context of a systematic training program.

Research on Planning Behavior of Teachers

Ever since Turner and Fattu had considerable diffi-
culty distinguishing teachers and nonteachers in terms of
their ability to frame instructional objectives based on
a diagnosis of pupil products and since Popham and his
associates obtained the discouraging findings which led
off this section, [C-20] a number of studies have been conducted
to test instructional systems designed to teach teachers to
frame behavioral objectives and to relate instructional
procedures to them. Popham's instructional systems do seem
capable of teaching teachers to establish behavioral
objectives and select instructional procedures related to
them. He also reported that pupils apparently learn more
when teachers frame objectives although such research is
difficult to conduct because if teachers don't select
instructional objectives and procedures, it's hard to tell
exactly what learning outcomes one should measure.

Research Employing Instructional Simulation

Cruickshank and Kersh conducted research using
simulation to train teachers and have reported positive
results. [C-8] Neither simulation is an elaborate one, but
the findings are nonetheless positive and provide encouragement
to those who would want to develop more elaborate simulations
for the training of teachers.

Other Research Related to the Training of the Teacher

In the last few years, especially stimulated by the
establishment of a number of regional laboratories with
intensive teacher training programs within them, there has
been an increasing quantity of specific studies directed
at the testing of particular instructional procedures aimed
to teach specific teaching skills or sets of behavior. For
example, at the University of Texas Research and Development
Center, a variety of studies have been done. Some of these
have been similar to the Interaction Analysis studies
mentioned earlier with teachers being taught category.
systems and helped to modulate their behavior while
receiving feedback derived from their own studies of their
own teaching. On the whole the results of this work have
been positive with teachers making significant changes
particularly in learning to ask particular kinds of
questions and to control their questioning behavior
effectively. (D)

Also in Texas a series of instructional systems has
been developed to teach teachers of elementary school
science a teaching strategy derived from the scientific
process. This system also appears to be effective in
inducing teachers to adopt the pattern of behavior that
forms the center of the instructional system. (See: Appendix)

In a similar line of work, the Regional Laboratory
of Kansas City has developed and tested an instructional
system designed to teach teachers a model of biology teaching,
also with promising results from the field studies. (*Appendix*)
Parsons conducted rather sketchy field tests of a system
designed to move teachers in a number of directions through
a complex Interaction Analysis system and also reports
positive work although there has been no replication from
independent sources and the data are sparse. (*Appendix*)

Bereiter and Engelman have designed a teacher training
system to teach teachers the model of early childhood edu-
cation which they espouse, and they also report consistently
positive results in the training of the teachers to produce
that model. (*E-ii*) Research for Better Schools, the Regional
Laboratory of Philadelphia, has designed a training system
to teach teachers to carry out the behaviors necessary to
implement the Individually Prescribed Instruction model and
report considerable effectiveness from what is a fairly
short and easy-to-administer instructional system. (*A-75*)

It is worth noting that most of this research is
product-related and really constitutes product testing
rather than basic research. Up to this point, it seems

clear that direct instructional methods can change teacher
behavior, that teaching skills can be taught, and that
relatively direct, easy-to-administer instructional systems
can be used for that purpose. Work done both at the
University of Florida and at the University of Massachusetts
as part of the feasibility studies of the Bureau of Research
Teacher Education Project has indicated that such instructional
systems can be monitored by management systems, but this
is hardly surprising.(G) Some studies have related the
changes of behavior by teachers to responses by pupils, but
this work is thus far fairly sparse and incomplete. Probably,
up to this point, the magnitude of changes in teacher
behavior are not ones which would be likely to bring about
changes in pupil response to the environment. That is
particularly true with respect to training in specific
behaviors or skills which may be employed after that point
by the teachers on a relatively infrequent basis.

For example, if we teach the teachers a skill such as
modulating their questions to induce various levels of
cognitive activity on the part of the children, the teacher
may or may not employ that skill frequently even though we
may know that we have trained him to do it, and that he has
the capacity to do it at will. On the other hand, much is
known about the effectiveness of IPI and the Bright or

Engelman system for the teaching of children, and it is
now known that we can teach teachers to implement those
models of instruction. In other words, to know that we
can train teachers to manifest certain skills is useful.
To know that we can do so in such a way that we can
implement a particular instructional model over a long
period of time is a finding of considerably more magnitude.

Teaching Teachers Models of Teaching

At Teachers College, Columbia University, a series of
studies have been conducted in the last few years built on
the work developed out of the Bureau of Research's Teacher
Education Project.(6-8) These studies are designed to learn
the extent to which teachers can be taught to manifest a
considerable variety of teaching strategies. The purpose
of this research is twofold. One is to learn whether teachers
can be taught complex models of teaching that they implement
on their own and second, the extent to which teachers can
master a variety of models of teaching or are limited to
only one or two types of teaching strategies. In research
completed during the past year, teacher candidates were
exposed to a series of instructional systems designed to
teach teaching strategies requiring very different sets of
teaching skills.

One of these teaching strategies can be characterized
as "personal" and is designed to induce students to creative
thinking behavior. The second can be characterized as
Group Investigation. In it teacher and students together
develop cooperative inquiry into problems of significance.
The third model of teaching is an inductive model and
involves data collection and analysis. The fourth model
is a behavior modification model derived directly from the
work of B. F. Skinner. (F)

These four models of teaching were taught to a group
of twenty-eight trainees during the fall of 1970. The
behavior of the trainees when experimenting with the models
was compared to their normal styles of teaching and to the
normal styles of teaching of their cooperating teacher.
When we compare the normal teaching styles of the student
teachers to the normal teaching styles of the cooperating
teachers, they are very similar with respect to amount of
questioning, amount of questioning requiring higher order
of response by children, amount of attention devoted to
procedures, the amount of attention devoted to including
students in the determination of procedures. Their
patterns of reward and punishment were very similar as well.

In experimenting with the several models of teaching,
however, the patterns of teaching manifested by the teacher

candidates were very different from both their normal styles
and the normal styles of their cooperating teachers and were
different in the ways predicted according to the specifi-
cations of each model of teaching. In the Inductive Model,
for example, they collected data with students, helped the
students to gather data, analyze data, and theorize about
the results of the analysis. These last two types of
behavior, helping students analyze data and theorize about
the results of the analysis, were extremely rare types of
behavior in the normal teaching styles of the teacher
candidates or their cooperating teachers.

Similarly, the Behavior Modification strategy produced
different teaching patterns from those the teachers normally
manifested. The same was true of the Group Investigation
Model in which the determination of goals and means by
teachers and students working together was in stark contrast
to the normal behavior of teachers with respect to the
development of procedures in the classroom.

Perhaps most dramatic, however, was the shift in style
brought about by instruction in the Creative Thinking Model.
This model requires teacher questions and pupil responses
at the synthesis level--(one of the highest levels of the
Bloom taxonomy). When experimenting with the Creative

Thinking Model, teachers' and students' verbal communications at the synthesis level comprised over fifteen per cent of their total verbal communications during those episodes, compared with less than one-tenth of one per cent in "normal" teaching styles.

It had been expected that the attitudes of the teacher candidates toward teaching and learning would effect their learning of the various models. That is, it was expected that those students who were oriented toward child-centered education would prefer the Creative Thinking Models and the Group Investigation Models as compared with the Behavior Modification Models and the inductive ones. This did not turn out to be the case. The teacher candidates learned the models irrespective of value orientation.

This does not mean that in the long run the teacher might not prefer one model to another or that over the long run he might not be more effective in one model than another. (There was great variation in the ability of teachers to learn any one model of teaching.) What it means is that direct instruction using individualized instructional systems were effective in teaching teachers who differ greatly in values and other characteristics to radiate a wide variety of instructional styles.

The instructional systems each consisted of six
"modules" or sections: (a) a theory section in which
students learned about the theory of the particular teaching
strategy and were acquainted with research on its effective-
ness and the types of instructional goals for which it was
appropriate, (b) a demonstration section in which a
variety of media were employed to demonstrate the model,
(c) a "peer practice" section in which the teachers
practiced by teaching each other, (d) a "guided practice"
section in which teachers practiced with children employing
specially-prepared materials, (e) an "application" section
in which teachers practiced in relation to content and
materials they selected themselves, (f) a "decision-making"
section in which the uses and appropriateness of the model
is studied.

These steps are apparently sufficient to prepare a
teacher to carry out a model of teaching for relatively
short periods (a few class sessions at a time).

If one wished the teacher to display a particular
model of teaching over a long period of time and to become
effective with its use with children to the point where it
would have a noticeable impact on their achievement and
affective growth, then it would be necessary to provide for

that teacher an opportunity to work in an environment which
was conducive with the use of that model of teaching. This
is dealt with in another section of this paper when we
discuss at considerable length the relationship between
the model of the school and the model of the teacher which
is the goal of the training program. It is a critical
issue. At this point, we can say with some confidence that
direct training procedures can be used to bring teachers
to specific levels of performance even in relation to
complex models of teaching. However, up to this point,
there has been no convergence of the three factors which
are probably necessary in order to evaluate performance-
based education. One is the development of a setting in
which the desired performances can be manifested. The
second is the development of effective instructional systems
to bring about those performances, and the third is the
convergence of these in a situation in which teachers can
get feedback about and engage in study into the consequences
of their behaving in specific ways.

Despite this, the Joyce, Wald, Weil, Gullion studies
of 1970-71 indicate, particularly if they are interpreted
in terms of the other research which has been cited here,
that we have within our capability the production of complex
instructional systems to train teachers to high levels of
performance and quite a variety of models of teaching. When

we bring this capacity together with the development of complex systems of teacher education that are, in turn, related to the educational settings in which the teacher is enabled to behave with what is consistent with the models he is being taught, it seems a reasonable hypothesis that there will be change of teacher behavior of a magnitude not seen here hitherto--one which will be likely to have an effect on pupil behavior to an extent not yet seen in any single educational experiment to date.

Curriculum Construction Experience

Outside of the field of teacher education there is now a wide variety of experience in the creation of performance-based curriculums for children and for adults in areas which are not directly connected with the training of teachers. There is so much diverse but fragmentary experience that it can only be sampled here in a most frugal manner. It behooves us to make the bias of the selection as clear as possible.

A selection has been made to try to indicate the nature of the curricular systems which have been developed and the types of results which have been obtained through the use of different types of systems. Thus what is reported here is of curricular systems using different instructional

techniques and research into the effectiveness of those various techniques.

In the second case, an attempt has been made to try to identify the models of teaching that have been proposed by the inventors of performance-based instructional systems for children.

In the third case, an attempt has been made to try to identify the types of domains to which performance-based education has been applied. This provides some idea of the potential for application within the teacher training field.

Training Systems

The training psychology movement described above has resulted in an enormous number of applications to a vast variety of military and industrial needs. The procedures used by the training psychologists have almost always resulted in instructional systems which are straightforward in nature. That is, they consist of sets of behavioral objectives and training tasks which are presented to the learner to induce him to practice the behavior to be learned. Successive tasks move him up a ladder of skills and in successive field tests, an attempt is made to improve the staging of the training tasks so

that there are reasonable increments of skill. That is,
most of the trainees can accomplish the jump from one task
to the next, but the step is large enough to minimize
boredom. It is peculiar that in the literature on training
systems so little attention has been paid to the develop-
ment of guidelines for determining optimality of steps.
That is, nearly everyone agrees that the steps should be
small enough to be feasible for the average trainee but
not so small as to induce boredom. At this juncture,
the yield from the vast literature does not consist of
principles that can be followed by the present generation
of people who are building training systems. (A) (A-78) (A-61-65)

Be that as it may, the systems consist of steps of
tasks which lead the student toward the complete performance
which has been specified in terms of the behavioral elements
that have been sequenced, and, as indicated before, each
task is accompanied by an evaluation device which can be
used to ensure that the student has accomplished the learning
which was specified for the task.

A variety of strategies have been employed in the
development of the training systems. For skills, especially
psycho-motor skills, there has tended to develop a demon-
stration, practice, feedback, redemonstrate, repractice,
feedback cycle which is repeated at various stages of

complexity. For example, in training a person to shoot a
machine gun, the trainee might see a demonstration film,
then see a demonstration with an actual weapon, then
practice, receive feedback on how well he is doing both
in terms of form and accuracy, see further demonstrations,
and so on until he has become proficient. This cycle is
very common. It is logical and straightforward, needs not
be guided by any theory, and it is effective for a great
many tasks which are simple or only moderately complex.
For more complex tasks, the strategy finds elements of the
behavior being taught and then gradually builds up into
the more complex ones. (A-35)

Programming was developed to implement operant-
conditioning techniques into training systems. A program
consists of a set of objectives and then a set of exercises
designed to induce the desired behavior and begin feedback
which either the learner gives to himself or is given to
him. Variations on programming include several varieties
of branching so the persons can skip ahead if they have
already mastered some of the skills which are to be taught
or can be recycled into further training if they are not
progressing at an optimal rate. (A-78)

Simulation is often employed to provide for a training
ground in which the learner can practice his responses to

certain tasks and then find out in a "real world" way
his responses so that he can modify his behavior to
approximate the correct one. In an automobile driving
simulator, for example, one sits in the seat of a realistic
automobile. It has a steering wheel, a shift lever,
a brake, a clutch if it's a manual transmission automobile.
Various tasks are given to him. Tasks in such a situation
are often presented by film. In the driving simulators,
for example, the film shows a road down which the automobile
proceeds, and various obstacles appear and have to be
avoided by the trainee's manipulation of the wheel. If
he does not avoid an obstacle, if he turns too sharply,
then the consequences of his act are fed back to him so
that he can modify himself. Again the tasks are usually
sequenced to lead the student from the simple toward the
complex. For example, he would be given practice in
avoiding people who are stepping from curbs, then practice
in stopping for a traffic light, then practice in doing
both at the same time. (A-1,2)

At present, game-type simulations have been developed
in a vast variety of educational areas. There are economics
games which are played by computer to teach students the
principles by which the economics of nations operations,
by game-type simulations to teach students about economic

geography, the effects of social status on human behavior,
how the economy of a city works, the principles by which
people behave politically, and so on.

There is considerable evidence that it is possible to
build a game-type simulation that will result in a definite
achievement of specified competency. This should not, of
course, be taken to mean that all the game-type simulations
that one finds on the market today are effective; there are
a great many presently available which, in my judgment, are
very poor bets for effectiveness, but sufficient is known
at this point about the construction of such games that it
is possible to engineer them. *(N-12)*

In the late '50's and the early '60's, came the
development of the language laboratory and the vast
quantities of programmed instructional materials for the
public schools. The experience of these developments seems
to indicate very clearly that is possible to build direct
instructional systems which are self-administering and which
are constructed so as to provide regular feedback along a
sequence of competencies to children in such a way that
the terminal behaviors are gradually achieved. *(R-74)*

The real potentials of systematic laboratories and
programmed materials have been obscured somewhat by public
reaction to the fearful vision of the possibility of a
school environment in which children sit day after day
before banks of consoles presenting them with simple tasks
and immediate feedback. This is unfortunate because it
has caused competency-based training of children to be
discussed in the dichotomous ways that methods have been
discussed in the past. That is, there has been a tendency
to reject any method that does not seem to be appropriate
as a single learning mode in every subject all day. The
fact is that children need exposure to a variety of learning
modes so that their environment is rich and offers
appropriate training for different kinds of learning
objectives.

As indicated several times before, IPI is the
single most dramatic application of training psychology
to a major curriculum area in the public school. It has
been applied to reading and arithmetic, and plans exist
for extending it to social studies. The curious thing
about IPI is it has proved so easy to disseminate in the
sense that once schools are committed to it, the teams
from Research for Better Schools can, within a relatively

short period of time, train the teachers and aides to
perform the IPI duties and can have the system operating
smoothly within a few weeks of when school opens. This
brings about a radical individualization of instruction
of a type which has not before been accomplished in anything
like so short a time or with such a relatively modest
increase in personnel. The reason that this is curious
is that IPI has been disseminated in the face of constant
criticism by educators who dislike what they see as its
impersonality. It seems that, failing to provide individual-
ization through the classroom teacher, they are bound and
determined to resist efforts to individualize through
technology. Be that as it may, the dissemination of IPI
has moved along at a considerable pace, and it presently
exists in over a hundred schools largely on the East coast
of the United States. (R - 46, 47, 48).

Innovation and Performance-Based Teacher Education

Performance-based education will only be useful if it increases the capacity to change the school. In this paper this problem is dealt with in terms of two perspectives; what has experience with innovation told us, and what should be the model of the teacher.

In the following section is a terribly brief overview of reform movements in education. The theme which is developed throughout the material is "what yield of knowledge have we from the last twenty years which suggests how teacher education should be meshed with other reform strategies."

What Has Been Learned Since 1950?

Abstract

Reform movements prior to 1950 were directed toward
dissemination of one type of teaching method (child-
centered, democratic-process teaching) which was assumed
to be good for all purposes and was to be used by all
teachers. The teacher was assumed to be the critical
person in the educational process.

Since 1950 several efforts have changed our insights
and our available technology.

1. Architecture and Organization. A movement to
    reform school architecture and organization of
    personnel has left us with the awareness that
    changing one aspect of a school rarely has effect,
    but several aspects, changed together, can have
    potent results, and that the education profession
    resists changes and often absorbs their impact
    without changing educational output.

2. Academic Reform. The Academic Reform movement
    has developed new approaches to teaching content,
    created strong materials for children, and has
    had little general impact on the lives of children
    except in those places where materials, teacher-
    training, and strong administrative leadership

have been present. Again, the message is that a
reform effort with several convergent dimensions
can be effective.

3. Technology. The Technological movement has produced
    a variety of technological forms which are effective
    for educational purposes but which cannot be
    implemented in the schools unless accompanied by
    changes in staff utilization patterns, staff-training,
    physical plant, and curriculum. Simply making
    technologies available to the teacher has not had
    much effect on education.

4. Teaching Strategies. A large number of teaching
    strategies have been developed and tested with
    positive results but implementation is elusive.
    To implement them requires the confluence of
    events indicated in 1-3, above.

The message is clear: (1) We have a much larger
armory of strategies than ever before. (2) The school as
presently organized and staffed is highly resistant to all
forms of innovation. (3) A confluence of changes has to be
initiated including staffing patterns, teacher training,
on-site leadership, curriculum, and materials of instruction
if changes are to be brought about and maintained.

1950-1970: What Have We Learned about Education?

Have the last twenty years resulted in enough increased
knowledge about education that we are in a significantly
better position to design and implement better educational
forms?

This is a tough question and the answer is not wholly
clear. We will approach it in three stages:

By very briefly describing the approaches taken

by reformers prior to 1950.

By describing increases in knowledge and skills

between 1950 and 1970.

By trying to identify the implications of these

increases for strategies of design and reform.

Before 1950: Two Strategies

Up until 1950 there were essentially two reform
strategies in education, each of which had been vigorously
pursued during the twentieth century. One of these was a
movement to expand educational offerings. The other tried
to change the general ends and means of schools. $(E-27)$ The
movement to expand the possibilities of education for more
citizens does not concern us here. The increase of

vocational schools, special academic high schools, consolidated
schools, and the expansion of programs in the secondary
schools were all attempts to make it possible for more
children to receive more types of education than they were
receiving before. The expansion of colleges is the recent
extension of this strategy.

The expansion of education concerns us less in the
present context than does the other kind of reform because
it involved not so much knowing how to educate as
deciding whom one wanted to educate and what he wanted
to teach him. Often the reformers who found ways of
expanding the educational system and its possibilities had
little or no control over the quality of what was done.
There are few people, in fact, who would argue at all that
the increase in the number of students attending secondary
schools during the first half of the century was in any
way connected with an improvement in quality during the
same period. If we ignore quality, however, the increase
in offerings was impressive.

The other kind of reform was based on definite beliefs
about what would improve the quality of education, as con-
trasted with expanding its clientele and offerings. The
essence of the thrust in the first half of the century was
toward moving education toward a more child-centered stance

and toward the active preparation for democratic citizenship.
The proponents of both the child-centered and democratic
stances believed that the best education enabled the student
to determine his own learning goals and the means he would
use to achieve them. They favored indirect teaching
methods, equality between teacher and child, and courses
of study which emerged as teacher and student interacted
rather than being set pieces. At the level of verbal dis-
cussion of education, the child-centered, democratically-
oriented movement was triumphant.

In many teacher-training institutions, democratic
process methods and child-centered methods were taught
on the verbal level. Textbooks, curriculum guides, and
national meetings were influenced by them. However, because
the primary method of teacher training was apprenticeship
to teachers in the existing schools and during the
apprentice period most of the effects of the verbal
training were neutralized. By the end of training very
few of the new teachers were noticeably more child centered
or democratic in their orientation toward children than
were their predecessors. (E-27)

The thrust of the reform was plain to see in its
literature. Curriculum texts such as John Michaelis'
methods books (F)8.4) emphasized democratic-process teaching.

They extolled democracy and its perfection as the central
purpose of the schools. The philosophy of the influential
Bank Street School toward early childhood education and
organizations such as the Association for Childhood
Education International were unswervingly child centered
and the philosophy was reflected clearly in their publi-
cations.

Despite a massive effort, reformers from 1900 to 1950
apparently were unable to achieve lasting reforms in actual
school settings unless some of their strongest devotees
remained there. Summerhill began on child-centered
premises and remained such because Neill remained there.(E-79)
The Bank Street School has remained child centered because
it has successfully passed down its mantle of leadership
to sympathetic heirs. Many of the other child-centered
schools, despite massive evidence (especially that from
the eight-year study(BP7) that child-centered and democratic
methods were advantageous to the child's education, changed
their character, or even disappeared after their strongest
supporters departed for other places. The persistence of
reform from the child-centered, democratic stances had
been very low indeed.(F-65)

The child-centered and democratically-oriented reform
thrust depended on changing the behavior of teacher toward
the models of teaching favored by the reformers. The
movement depended almost entirely on inservice education.
School organization and technology were not created or
manipulated by these reformers--in fact, the leading
advocates often opposed organizational reform and techno-
logical devices--who wanted the classroom teacher to change
and who believed he could and would change. There is massive
evidence, of course, that he did not move as they had
hoped.(5)

1950-1970: New Ideas

From 1950 to 1970 there have been three or four thrusts
in research and in reform of education that have changed
our knowledge from what it was in 1950.

Architecture-Organization (E-35)

One of these is the school architecture movement and
the school organization movement which accompanied it very
closely. The primary focus of the architecture movement
has been to move the concept of the single, all-powerful
teacher performing all roles in the life of the child and
toward a concept of education in which many adults,

occupying many roles, would support the life of the child
as he would endeavor to educate himself in a variety of
ways. (E-B) In other words, the thrust was moving from a
relatively homogeneous conception of teaching as something
that could be done for a group of people by one person
(supported by specialists in areas where he was clearly
unable to perform) toward a conception of an education of
many kinds created by a number of people in the life of
the child. (E-L.7) Thus conceptions of team teaching and
differentiated staffing accompanied the introduction of
schools which were not built like "egg crates" but which
rather had the kind of smooth-flowing, flexible spaces
that could be adapted to a wide variety of modes of edu-
cation and a wide number of people working together. (8)(E-C)
Thus the organizational reform movement and the archi-
tectural reform movement grew simultaneously and, largely,
together.

A number of things have been learned from the
experience of those intertwined efforts. In the first
place, this reform movement was massively resisted by the
teaching profession. In the school district in which the
famous Valley Winds School was opened in the fall of 1964,

It was also learned, despite or perhaps even because
of a dearth of formal research, that one cannot simply put
a group of teachers into a new setting and expect education
to change in the least. Differentiated staffing provided
extra hands but did not seem to provide qualitative changes..
Wide group instruction turned almost invariably to lectures,
often with audio-visual aids, and the free-floating modes
of self-instruction that had been envisioned by the
promulgators of the movement.

The experience of the reform movement in architecture and
school organization has indicated very clearly that it is not
enough simply to organize teachers into teams, provide them
with aides and expect any radically different type of
teaching to take place.

There is, however, one kind of general observation
that can be made that points the way to the future. That
is, in some of these schools where: (1) organizational
changes have been made and (2) new physical plants have
been developed that provide for an easy implementation of
a different kind of education and (3) <u>at the same time,</u>
<u>a massive inservice effort has been carried on under strong</u>
<u>leadership</u>, the school is very different from the average
one. A good example of this is the Kennedy High School

a twin school, also of a snail design, was opened on a
traditional model that was proudly proclaimed by its
principal and teachers to be superior to the madness that
was going to go on in the Valley Winds School. (B.70) Thus the
beautiful school building, with its free-flowing, flexible
classes was divided by means of movable furniture into
egg crates within the smooth snail surfaces. Many
educators who had previously been regarded as progressives
became suddenly concerned about what would be the effect
on the child of the presence of more than one adult in
his educational life, especially the young child. The
model of the self-contained classroom teacher was defended
by the old reformers as the new reformers sought to bring
alternative staffing patterns into the school. The
corresponding movement toward nongradedness shepherded
into existence especially through the writings and
speeches of Robert Anderson and John Goodlad was perverted (E-49)
into a series of steps through which all children would
go, often at the same rate, resulting in many cases in
"fifty grades" whereas before there were six in the
elementary school. It became an excuse for homogeneous
practices, highly-sequenced instruction, and an even more
regimented school was able to result from the banner of
the open concept.

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a different kind of education and (3) at the same time,
a massive inservice effort has been carried on under strong
leadership, the school is very different from the average
one. A good example of this is the Kennedy High School

in Montgomery County, Maryland, where a varied group of
innovative people were fortunate enough to inherit a
facility which provided not only a good deal of open space
but space where a variety of support systems could be
developed, such as library systems, audio-visual systems
which students could use themselves, and so on. The key-
note of the Kennedy High School is student participation
in the government of their own affairs, especially their
academic affairs; and the leadership has succeeded in
bringing about a school climate which is noticeably
different from that of the strong academic schools of
equivalent demographic population in the nearby Montgomery
County area. This is not to say that the Kennedy School
is necessarily superior to the others, but it is certainly
very different from them.

The Kennedy-type experience is far more promising
than simply employing team teaching or adding aides to the
school. Worse, some districts have developed an open-
plant school and then introduced the school administration
and faculty to it without a special training program.
Nearly everyone concerned has been disappointed and
frustrated. Those places which have combined an artful
planning of the facility to include support system areas,

strong leadership, and intensive inservice training have
in some cases made a noticeably different atmosphere.

The Academic Reform Movement

Since 1950 also, we have seen the rise and, to some
extent, the decline of the school reform movement built
around the teaching of the modes of inquiry and the
structures of the academic disciplines. (34) Projects have
developed curriculum outlines, materials for children and
training systems for teachers built around the structures
of the sciences, mathematics, and the social sciences and,
to a much lesser extent, English and the foreign languages.
Many of these reform projects were relatively well
supported and had the advantage of prestige from their
sponsoring organizations representing segments of the
academic community. Many were also able to conduct lengthy
workshops to train teachers how to use their specific
materials. They were able to follow up these workshops
in the schools to provide support to teachers who were
trying out the approaches they had developed.

The academic reform movement resulted in the develop-
ment of some very interesting approaches to the teaching
of subject matter. Many of the courses and many of the
teaching strategies were very interesting. A substantial

body of approaches to teaching has been developed as part
of the academic reform movement. (F) The results of the
entire movement, however, are less than remarkable.
Despite all the publicity, the enormous quantities of
inservice courses and the painstaking production of great
quantities of instructional materials (which although they
range considerably in quality contain among them some
really outstanding examples) there has been really very
modest changes in both the content and the strategies used
by teachers in the schools.

As in the case of the school organization movement,
however, the academic reform movement has had a very
substantial impact in those places in which a strong,
follow-through inservice effort has accompanied the
introduction of the approaches. It seems quite plain that
one does not simply develop a new curriculum structure
which was adopted at the policy level, back it up with
materials for instruction to children, put it in the schools
and get very much of a change unless this is accompanied
by changes in school organization and inservice training.
It does appear that there is quite a difference, however,
while there is a concatenation of events. The changes are
seriously eroded by the passage of time, however, unless
there is a sustained follow-through over the years.

The Development of New Teaching Strategies

Again, largely since the 1950's, a large number of psychologists and educators have developed an interesting range of teaching strategies. Many/of these resulted in positive findings from research. Table One indicates just a few of the range of possibilities that have been developed.

TABLE ONE

A LIST OF EDUCATIONAL APPROACHES,
GROUPED BY ORIENTATION AND
DOMAIN OF MISSION (See B.b.F) -

APPROACH	MAJOR THEORIST	ORIENTATION (Person, Social In- teraction, Infor- mation-Processing, or Behavior-Modification)	MISSIONS FOR WHICH APPLICABLE
1)Non-Directive	Carl Rogers	Person	Development into "Fully- Functioning" Individual (How- ever, broad ap- plicability is suggested, for Personal develop- ment includes all aspects of growth.)
2)Awareness Training	Shutz, Perls	Person	Increasing Per- sonal capacity. Much emphasis on interpersonal development.
3)Group Investigation	Dewey, Thelen	Social-Interests	Social Relations are permanent, but personal development and academic rigor are included.
4)Reflective Thinking and Social Inquiry	Hallfish and Smith, Massialas and Cox	Social Interaction	Improvement of democratic pro- cess is central, with more effective thinking the primary route.

TABLE ONE (CONT.)

5) Inductive Reasoning	Tabs, Suchmann and others	Information-Processing	Primarily designed to teach academic reasoning, but used for social and personal goals as well.
6) Logical Reasoning	Extrapolations from Project (See Sigel, Sullivan)	Information-Processing	Programs are designed to increase thinking, but also are applied to moral development and other areas (See Koblberg)
7) Psychoanylistic	See L. Tyler and others	Person	Personal emotional development is primary and would take precedence.
8) Creative Reasoning	Torrance, Gordon	Person	Personal development of creativity in problem-solving is priority, but creative problem-solving in social and academic domains is also emphasized.
9) Academic Modes	Much of the Curriculum Reform Movement (See especially Schwab and Bruner for rationals)	Information-Processing	Designed to teach the research system of the disciplines, but also expected to have effect in other domains (i.g., sociological methods may be taught in order to increase social understanding and problem-solving.

TABLE ONE (CONT.)

10)Programmed Instruction	Skinner	Behavior Modification & Theory	General applicability; a domain - free approach.
11)Conceptual Systems Matching Model	D. E. Hunt	Person	An approach designed to increase personal complexity and flexibility.

The range of teaching strategies which is presently
available is really formidable. The difficulty in imple-
menting them in schools, once again, has been one of
implementation except where a massive inservice effort
and organizational effort have been brought to bear around
a given teaching strategy. Few of the innovative strategies
have come into existence in the real world of very many
classrooms without a powerful effort. Where this has taken
place, however, we have been able to see rather substantial
changes in instruction. (E-12) None of these has taken place
on a wide enough scale to show up in achievement scores
or attitudinal changes in a large area but within the small
areas in which they have been implemented, many of the
research results have been quite positive.

The development of teaching strategies has, of course,
been clouded by the tendency to try to find a teaching
strategy which will serve the same function as the universal
solvent was expected to serve during the days of the
alchemists. In other words, many people have tried to find
a teaching strategy that would solve everybody's problems
for all time. The actuality is that various teaching
strategies have been found which serve certain kinds of
useful purposes and which may not serve very many other

purposes than the narrow ones for which they were constructed.
For example, inductive teaching strategies have often been
presented as if they would result in the general improve-
ment of the student's self-concept, his academic achievement,
and his relationships to his peers. What has been fairly
well demonstrated is that inductive teaching strategies can
very well teach the process of induction to rather large
proportions of students, but they are quite clumsy a. means
for teaching all areas of the curriculum to all students.
Similarly, person-centered teaching strategies apparently
can be effective in improving the self-concept of students,
but do not necessarily improve overall achievement. (E-24)

Operant conditioning is an extremely efficient
teaching strategy for specific ends, (E-107) but there is very
little research on its effect on the self-concept or on
creativity. By the same token, strategies to improve
creative thinking have often proved effective for doing
just that, (E-49) but by their very nature they do not very
often help the student approach specific learning tasks
where he is to master skills or learn specific concepts. (F-11)

The efforts to develop effective teaching strategies
have resulted in a really rich variety of available models

for teaching and curriculum-making, but they tend to be useful for specific rather than for general purposes.

Educational Technology

Also since 1950, a variety of educational technologies have grown up and been applied to education. Television, simulation, programmed instruction, instructional systems using tape, such as language laboratories, and quite a variety of other technologies have been developed. In short-term, specific experiments, many of these have been developed and shown to be effective for achieving specific learning goals. However, many of them have foundered seriously when they have been implemented in schools. Partly this has been due to the conditions of implementation. Guba's excellent study of Impati (in which an aircraft flying over the midwest broadcast educational television programs to a variety of schools) illustrates the point. $(E-56)$ Guba studied the usage of the televised programs within the schools and found that, on the whole, teachers did not use them effectively and that children were massively uninfluenced by the programs. Neither group was well prepared to receive the products.

Technological changes have had much the same history as the other types of innovation. When implementation was accompanied by a thorough-going inservice program where

appropriate support materials were provided and where the
administration was solidly behind the effort, the technol-
ogies have generally proved to be feasible and some very
promising changes have taken place. (E-68)

The Message from the Medium

Thus, it appears that while there has been no dramatic
discovery of a single approach to teaching which will solve
a large proportion of our educational problems, the last
twenty years has resulted in the development of a lot of
very sound procedures and technologies and organizational
changes any one of which taken alone can have a considerable
impact on the life of the child provided that it is imple-
mented properly. The real message is, however, that the
public school as it is usually organized is not a fertile
place in which to plant any kind of educational innovation.
The custodial teacher role in which the teacher is responsible
for all phases of instruction either in several areas, as
in the case of the self-contained classroom teacher, or all
aspects of one area, as in the case of the departmentalized
specialist, is highly resistant to innovation of any kind.
In those places where massive, multi-dimensional efforts
have been made, however, significant changes have taken
place in the life of the students.

We have the armory to suggest a vastly different
education than we now have. To learn whether we are _really_
ahead of where we were twenty years ago we will have to
converge forces on educational changes. That awareness is
probably our quantum leap from the past.

The Bureau of Research

Models:

The Application of the "Systems" Approach [a]

At this time, the bulk of the experience in broad-scale systems planning of performance-based teacher education lies in the products of the bureau of research teacher education program.

The following descriptions of these projects is largely taken from Chapters Two, Three, and Four of "Implementing Systems Models for Teacher Education: Strategies for Increasing Feasibility." (Teachers College: 1971) Final Report of Project No. 00774, U.S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research.

The material describes the assumptions made by the systems planners, the types of performance models of the teacher which were developed, and the characteristics of the program strategies which were developed. It attempts to identify the types of tasks necessary to make feasible the implementations of the Bureau of Research Models developed by teams working at:

> Florida State University
> University of Georgia
> University of Massachusetts
> Michigan State University
> Northwest Regional Educational Laboratory
> University of Pittsburgh
> Syracuse University
> Teachers College, Columbia University
> The University of Toledo
> The University of Wisconsin.

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[a] References in this chapter all relate to Bibliography "G" which contains the reports of the Bureau of Research projects.

The Assumptive World of Systems Planning in Teacher Education

The set of common aspects of the program models reflect an assumptive world which is made up of three parts: (1) a commitment to the application of systematic, future-related planning procedures to education, (2) a commitment to bring educational training to bear directly on the revision of public education, and (3), (even more) of an awareness of the possibilities of contemporary management technology. An individualized, let alone a personalized program can not really be conceived of for a large student body without the capacity to obtain and store vast amounts of information about students and to maintain and deliver a wide variety of alternative instructional experiences as appropriate.

Thus, although educators have talked about individualized curricula for decades they have not lived in a technological world which would enable a really thorough form of it. Nearly all successful forms of individualized instruction have depended on a very favorable instructor-student ratio and even then the instructors have to be highly competent and committed to individualization and personalization.

Quality control has been similarly limited. Although curriculum theory has postulated for many years that there should be direct linkages between behaviorally-stated objectives, instructional alternatives, and evaluation processes, the actualization of this paradigm has not really been possible. For example, even a committed instructor teaching a course to twenty students simply cannot manufacture enough tests by himself to track progress adequately and adjust instruction to the varying rates of progress of his students.

With the advent of technologies for developing large and complex information-storage-and-retrieval systems there arrived also the capacity to develop management systems which could coordinate student characteristics and achievement with instructional alternatives and maintain reasonable levels of quality control. Very few educators have as yet become familiar with these technologies, partly because they are new and not yet disseminated throughout the education community and partly because many educators equate "management systems" with "dehumanization," and have reacted adversely.

It is safe to say that all the program model teams are comfortable with the idea of management systems and believe that when we learn how to use them we can make education much more flexible and human.

Thus, they live in an assumptive world in which one looks for ways of developing "support systems," "choice points," and "feedback systems," and they develop training in "simulators" with "recycling to a more appropriate alternative" and "increasing complexity of instructional tasks." In other words, they attempt a massive task analysis of the problem of preparing a teacher, confident that a task analysis can be made and that management systems can be created to implement the results. They recognize that enormous quantities of jargon will be needed to symbolize the concepts of objectives, modular curricular alternatives, evaluation and support systems necessary to such an effort. They believe that such a technology will eventually not only permit instruction to be tailored to individuals but also will enable the student himself to shape many instructional goals and means.

Hence, the "model developers" live in an assumptive world comprised of management systems theory, a concern with efficiency and systematic training (the world of cybernetic psychology, actually), and the belief that the results of applying these to teacher education will be a more personal environment for the student, a more effective teacher-product, and a university in which desirable innovation can be made (cycled into the system) much more easily than is true of the present organization.

Common Working Hypotheses

The teams worked independently and completed their reports within a very short span of time. However, in addition to their use of systematic planning procedures, the ten teams operated on certain implicit but common working hypotheses about teachers and training programs, although they differed considerably in the ways they applied these assumptions to teacher-education program development. These common hypotheses are manifested through the program reports and represent basic but tentative assumptions which implicitly formed either a common frame of reference about teaching and training or the basis on which decisions could be made concurrently with the testing of the assumptions themselves.

1. All of the teams viewed the teacher as a clinician in much the sense that physicians are clinicians. The teacher was seen as the possessor of strategies for making instructional decisions, and as the possessor of the needed repertoire of knowledge and clinical skills for carrying out his decision. It was assumed that decision-making competence and interactive teaching compe tence could be defined with precision and both played prominent roles in the performance models. (See: Michigan State, ComField, Florida State for examples.)

2. Teachers were generally though of as members of clinical teams, and frequently as specialists on those teams. Several of the models provided "career ladders" with places for many kinds of specialists in a career hierarchy. This should not be interpreted to mean that "team teaching," as presently practiced, was seen as a panacea for the ills of education. Rather, it reflects

the belief that colleagual relationships are necessary so
that teachers check one another's opinions, examine one
another's teaching, coach one another, and specialize in
order to increase competence.[1] (See: Georgia, Toledo,
Wisconsin, Massachusetts for descriptions of teams of
specialists.)

3. All of them assumed that it is possible to define the needed
competencies of the teacher in terms of specific behaviors
and to match those behaviors with specific learning exper-
iences, especially short instructional modules calculated
to achieve those objectives. Furthermore, it was assumed
that large sets of instructional modules could be combined
into curricular systems which could be entered at many
points in the teacher-training process and could be pre-
scribed to match the personal characteristics of the stu-
dents who were preparing to be teachers. It was assumed
that objectives and the specifications of modules could be
stored in automated data banks so that they could be re-
trieved on the basis of diagnoses shared in or even made
by the teacher trainee himself.[2]

4. It was assumed that management and control systems could
be developed to monitor such teacher-training programs and
to provide them with flexibility, especially adaptability
to the student. In several cases, the models included
the specifications for computerized systems for managing
programs including several thousand behavioral objectives
matched with an equally large number of instructional
modules. (See: Florida, Syracuse, ComField for succinct
descriptions.)

5. All of the models assume that any teacher who could take
major responsibility in a classroom would need a long
period of training and that a consortium of colleges and
school districts was necessary to provide the conditions
for academic training, pre-service training, internship
or practice teaching, and continuing in-service education.
They also assume that an educational team will contain
personnel of more limited functions whose training could be
relatively brief.

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[1]The conception of the teacher articulated by Robert Schaefer in
The School as a Center of Inquiry (New York: Harper, 1967).

[2]The Michigan State Model, for example, contained more than 2700
behavioral objectives matched with instructional modules; all
organized within an automated retrieval system. Toledo selected
over 1400 objectives from a list of over 2100.

6. All of the teams made a heavy use of simulation laboratories--
   situations which are somewhat less complex than the "real
   world of the teacher" in order to teach clinical skills.
   The "real world of the classroom" is considered entirely
   too chaotic to function as a setting for learning complex
   teaching skills. The simulation laboratory, by simplifying
   the training situation, permits teaching skills to be
   acquired sequentially until the teacher has a range and
   depth of competency to cope with and learn in the complexity
   of the school situation. The models tend to prescribe a
   sequence of activities which proceed from an identification
   of a clinical skill, its practice under simulated conditions
   or with small groups of students, and then its practice
   in a field situation. This kind of pattern, replete with
   systematic feedback and assessment, occurred again and again
   in all ten of the models. (See: .ComField, whose plan
   centers about the use of teaching laboratories.)

7. All of the teams hoped to make available to the teacher
   knowledge from the behavioral sciences which he could use
   to make and carry out educational decisions. They saw the
   teacher as an applied scientist in a basic sense of the
   word, using behavioristic techniques to plan for students
   and to select appropriate experiences for them. At the
   same time they were acutely conscious of the limits of
   our knowledge both about teaching and about preparation
   of teachers. Hence most of the models included a large
   variety of strategies for preparing the teacher and all of
   them were designed to equip him with a large repertoire of
   teaching strategies from which he could select for use with
   his students, as well as with techniques he could use to
   study the effects of his teaching. (See: Teachers College
   for explicit positions in this area.)

8. Last, it was assumed that a model should contain provisions
   for revision and redevelopment as a fundamental feature--not
   as a subsidiary element or aftergrowth. Replanning and
   reimplementation are assumed to be basic, as basic as
   training components themselves. Also, all of these models
   were created within a very short period of time, and each of
   the teams was acutely conscious of the need to build a
   structure that could be revised and further developed. Con-
   sequently, various aspects of each model are better developed
   than other aspects. In some cases, the behavioral objectives
   are elaborately specified, but much work remains to be done
   in the development of instruction systems to achieve those
   objectives, although the basic strategies are laid out. In
   other cases, a great deal of attention was paid to the de-
   velopment of management systems although much remains to
   be done to build satisfactory behavioral objectives and
   instructional modules to complement the well-developed
   management systems.

The Nature of the Performance Models

A performance model is an integrated set of behaviors·which are coherently related to each other. This system of behaviors constitutes the product which the educational program is designed to achieve. When the desired end-product of a program has been described as a functioning system of performance-in this case, a working model of a teacher-then it.is possible to begin the substantive development of the means of the program.

There are great difficulties to the development of a "system" description of a complex functionary like a teacher. We can underline these difficulties by identifying the conventional ways of developing conceptions of complex jobs and the obstacles to applying these to the description of the teacher. There are four general ways of developing performance or working models of complex functionaries. One of these is by the empirical study of a functionary. To develop a model of a salesman (for example), we might study the most successful salesman (salesmen) of a given product (the one whose dollar

sales were the highest) and determine his (their) behaviors. A second method is to obtain a consensus by members of a field about the characteristic or optimal behavior of functionaries within the field. Again, using the case of a salesman, one might ask outstanding salesmen what behaviors were responsible for their success, or ask regional sales supervisors what makes the best salesmen so effective. A third is to derive the model from the application of a theory, either an empirically-verified theory, or a deductive construction. Again, with respect to salesmanship, one might study social psychological theories about the kinds of factors which bring about sales with the object of training salesmen to bring about those conditions. Selecting a theory, one would deduce the properties of the salesman from it. Hence we would have (do have) theories of salesmanship based on rapport-building activity (make friends with the client), on behavior-modification (shape the client!), on status-linked behavior (make the client feel he will lose face if he doesn't buy) and so on. The fourth method is to make a comprehensive analysis of all the processes engaged in by the functionary. Such an analysis draws on theories, consensus, and the application of empirical studies where appropriate. To develop a model of an airline stewardess, for example, we might analyze the aircraft and the equipment, work out a description of services which might be offered during flight, check customer and supervisor opinion, and build, from those data, a simulator in which we could try alternative patterns of behavior until a satisfactory combination emerged.

Ultimately, the application of systems procedures to the development of a training program requires the fourth course of action. We are not ready for this course as yet. There are relatively few comprehensive empirical studies as yet of what teachers do and there is still little knowledge about the kinds of procedures which are followed by the most able teachers. (In fact, how to identify effective teachers is a question which has, by no means been resolved!) There is, in fact, considerable controversy about what criteria of performance to use. Complicating the situation is the position taken by many educational leaders, such as Arthur Combs[1], that the most effective teachers are those who are most fully themselves, and have developed a style which actualizes their personality. This position almost denies that there could be agreement on the performance of a capable teacher, for they would be unique artists, actualizing themselves and facilitating the actualization of their students through unique interaction. Also, there is not yet a sufficient theoretical base, particularly one grounded in empiricism, to permit a full description of the efficacious teacher in terms of a theoretical model about the conditions which produce learning. Yet, there are sound theoretical positions about learning and training, and many of them are empirically grounded. The work in this area simply is not complete, but there is much to build on.

Each of the teams of model-builders had to reconcile themselves to our present state of knowledge and the lack of agreement on con-

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[1] Combs, Arthur, The Professional Education of Teachers: A Perceptual View of Teacher Preparation, Boston: Allyn and Bacon, 1965.

ceptions of the effective teacher. All worked under the serious
limitations of time, or they probably would have engaged in major
studies to create more comprehensive analyses of the teacher
function. Yet, considering the time limitation, the analyses
actually engaged in are remarkably complete and strikingly similar,
although the range is instructive. In their work, we can see
variations on each of the four common ways of developing perfor-
mance models.

Each team of model-builders made a set of choices which nar-
rowed the ground he had to search as he tried to develop a perfor-
mance model. The approaches which resulted are interesting in their
diversity, but also in their common belief that it would be possible
to develop behavioristic performance models of teaching. _____
They all shared the belief that a complex
professional functionary would have to be a decision-maker and a
clinician, in the same sense that a physician is both of these
things. (He decides and he executes.) They all envisioned a
person of far greater responsibility and capacity than is ordin-
arily the case in the teachers of today's schools. They conse-
quently envisioned not only a teacher who is different from today's
average classroom teacher, but a school organization which is con-
siderably different. This projected change requires that school
districts make operational changes in order to make a setting for
implementing the programs and making effective use of their graduates.
The models tended to assume career hierarchies, ranging from the
more simple to the more complex functions within team structures,
which also assume changes in the school.

Criteria for Effective Performance Conceptions
of the Teacher

To function effectively as the goal of a program, the perfor-
mance conceptions need to be behavioral and unified, and to represent
a working model of the teacher. Behaviorality is essential in the
construction of a systematic program. A general behavioral specifi-
cation provides program direction and permits a task analysis into
behavioral elements (specific behavioral objectives). This enables
training procedures to be matched to behavioral elements in a modular,
managed plan.

Unity refers to the internal consistency of the performance
conception and the "fit" of its major components to one another.
Unity provides distinctive direction to a program and consistency
among its parts--thus it increases the power of a program by providing
for cumulative impact of program components and clarity of direction
to faculty and students.

The "modelness" of the performance conception--the adequacy of
its representation of a functioning teacher provides for the inte-
gration of specific competencies as they are developed in the

program so that they work together. When one considers the complexity
of the programs to prepare teachers which result from systematic
planning--almost 3,000 modules in some cases--it is no mean feat to
ensure that such a myriad of behaviors become related, in the trainee,
so that he can operate effectively. One of the considerable poten-
tials of systematic behaviorism in program planning is in this area--
the creation of a program whose training products (achieved behavioral
objectives) become related into a real-life teacher who replicates
the idealized conception of the teacher. One of the great difficul-
ties of the traditional training program has been the lack of such a
performance model and the unrelatedness of program elements or their
lack of coordination (learning psychology at a time far removed from
its application, for example). Unless the systems planner develops a
clear, comprehensive conception of the performing teacher, the advan-
tages of systematic planning will not be realized.

This conception has philosophical as well as practical impli-
cations, for the kind of teacher who results should reflect a philo-
sophically acceptable view of education. A teacher is a creator of
environments for children--he creates a large part of the world of
childhood. This is of such importance that we must be able to
accept the philosophical underpinnings of the model of the teacher as
well as the practicality or workability of the model.

These three criteria: behaviorality, unity, and "modelness"
will be applied as we discuss the conceptions of the teacher that were
developed.

The Pittsburgh Approach
An Individualizer of Instruction

The Pittsburgh team selected the individualization of instruc-
tion as the focus of teacher training. They decided to build their
performance model around a conceptualization of a teacher who could
individualize instruction and who would work in schools organized
to tailor instruction to individual students. They describe indivi-
dualized instruction as follows:

Individualized Instruction. The central theme in the
elementary instructional programs for which the new model
will train teachers in individualization. This term co-
vers any arrangements and procedures that are employed
to ensure that each pupil achieves the learning goals
designated for him. The definition of individualiza-
tion used in this model is as follows: Individualized
instruction consists of planning and conducting, with each
pupil, programs of study and day-to-day lessons that are
tailor-made to suit his learning requirements and his
characteristics as a learner. This definition focuses on
instructional planning with and for each individual student

before teaching him, then teaching him according
to the plan.[1]

Six features of individualized instruction programs were
identified and the Pittsburgh program is designed to teach the future
teacher how to bring about instruction that has those characteristics.

1. Instruction is organized in terms of pro-
    grammed curricular units rather than courses,
    with the units in each curricular area arranged
    in a specified sequence.

2. On the basis of achievement pretests and the
    diagnosis of learner characteristics, lessons
    are tailor-made with each pupil rather than being
    planned for a group.

3. Several modes of individualization are employed,
    singly or in combination, in suiting instruction
    to the individual pupil: varying learning goals
    from pupil to pupil, varying learning materials
    and equipment, varying the learning setting (in-
    dependent study, pupil team; tutoring by the
    teacher, small group working without the teacher,
    small group with the teacher, large group), varying
    instructional techniques, assigning different
    students to different teachers, and varying the
    rate of advancement through the curriculum.

4. Each pupil is expected to master a learning task
    before proceeding to the next task; mastery is
    determined with use of a unit post-test. The
    criterion score for mastery is empirically de-
    termined in relation to performance on subse-
    quent tasks.

5. Teachers offer pupils help chiefly on an indivi-
    dual basis, and are always available for consul-
    tation.

6. The pupil conducts most of his learning inde-
    pendently of the teacher, employing self-direction.[2]

Whether the Pittsburgh team considered conceptions of the teacher
other than an individualizer of instruction is not clear from their
documents nor do they explain alternative conceptions of individualized

[1]University of Pittsburgh, A Model of Teacher Training for the Individ-
ualization of Instruction (OE-58017) Washington, D.C.: U.S. Office
of Education, 1968. p. 3.

[2]University of Pittsburgh, Ibid., pp. 4-5.

instruction or criteria for selecting the one they did.

However, having chosen, they proceeded to make a task analysis of the process of individualizing. The task elements that result fit together logically and are almost certainly workable, given certain working conditions.

(It is worth noting that the Pittsburgh design for teacher training utilized the same features that they wish the teacher to employ in individualizing instruction. In other words, the same specifications are used for the teacher performance model as for the teacher education system model, except for the obvious adjustments for client differences.)

To make an operational description, in terms of the specific behavioral objectives for the program, the description of individualized instruction was expanded and made more specific, although the Pittsburgh Model is in general not nearly complete and much work will be done before we can assess it.

The Pittsburgh conception of the teacher assumes a particular type of school with special support systems; it makes no attempt to train a teacher of classes--the Pittsburgh teacher is a teacher of individuals. The teacher is thus seen as a system within a system, which increases the likelihood that their working model will turn out to be feasible.

At the same time, the Pittsburgh conception would not fit any school situation. To take maximum advantage of the competency of their teacher, one has to create a school in which teachers are deployed in an organization which facilitates individualized work and are backed up by support systems which include banks of individualized, self-instructional materials (such as IPI).

The specifications of the Pittsburgh teacher and program are sufficiently incomplete that it is difficult to evaluate the model completely. However, the competencies appear to be behaviorally stated consistently and clearly. The fairly narrow and distinctive description of the teacher as an individualizer lends itself to a relatively unified conception. There may be a message in this, for the Pittsburgh performance model has a unity not achieved by any of the more eclectic approaches (and perhaps not achievable by any broader approach).

As to the extent to which the conception appears to be a working model of the teacher, the Pittsburgh task analysis (which is made clear in several illustrations (pp. 105-107) is straight-forward and very tight--with the relatively narrow and distinctive conception of the teacher, this can be organized very clearly.

However, what will happen as the conception is expanded to
make a full program is not clear. Is the teacher to be prepared
to define and facilitate objectives in all areas for all learners?
Unless some clear limitations are made the specifications even for
an individualizer can approach those for a Renaissance Man. If a
teacher is a definer and facilitator of any learning goal, then he
is probably being defined as a system analyst backed up by a
fully-developed system. Pittsburgh seems, as do many of the models,
to shade in the direction of a model which may be beyond the ca-
pabilities of the human, requiring information-processing and res-
ponse capability more appropriate to a large organization. As we
shall see, several of the other programs also shade in this direction.

<div align="center">

The ComField Approach:
A Teacher Who Can Produce Learning

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The performance model developed by the team representing the
consortium gathered together by the Northwest Regional Education
Laboratory describes the teacher in terms of instructional and non-
instructional competencies. We shall give attention only to the in-
structional aspect. The description of instructional competency
begins with a description of the teacher as a "person who can
bring about learning in children." Or stated differently, "who can
bring about appropriate changes in pupil behavior."[1]

In order to make this specific, the ComField team committed
themselves to develop a descriptive taxonomy of the kinds of learn-
ing that are desirable for elementary school children and determine
the kinds of teaching which would be likely to achieve those ob-
jectives.

Having established the prime objecti _ of a teacher
education program, the next step is to determine how
this objective is to be brought about. In terms of a
systematic analysis, this requires four interrelated
steps:

1. specification of the pupil outcomes desired:
2. specification of the conditions by which each
   outcome can be realized:
3. specification of the competencies needed by
   teachers to provide the conditions that are
   needed for the realization of each outcome: and
4. specification of the conditions by which the
   needed teacher competencies can be realized.[2]

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[1] Northwest Regional Educational Laboratory, A Competency Based,
Field Centered, Systems Approach to Elementary Education, (OE 58020)
Washington, D.C.: U.S. Office of Education, 1968.

[2] Northwest Regional Educational Laboratory, Ibid., p. 7.

In order to make a full development of such a statement of per-
formance, the ComField team needed to go through four steps. The
first three defined the performance model, or the goals of teacher
education, and the fourth developed the teacher education program
itself.

Figure 3.1. Steps in Developing a Program: ComField[1]

STEP 1	STEP 2	STEP 3	STEP 4
Pupil outcomes that are desired.	Conditions that bring about the pupil outcomes that are desired.	Competencies needed by teachers to provide the conditions that bring about the pupil outcomes that are desired.	Conditions that bring about the competencies teachers need to provide the conditions that bring about the pupil outcomes that are desired.
The goals of education.	The instructional program within the schools.	The goals of teacher education.	The teacher education program.

Put another way, it was necessary for the ComField team to develop
a taxonomy of pupil outcomes, to make postulates about the kinds of environ-
mental conditions that would be likely to bring about those outcomes, to
make a further specification of the behavior of the teacher that would
produce those environmental conditions.

This approach involves the specification of theoretical or empirically-
derived positions about learning. It thus can take advantage of the be-
havioral sciences, but must also operate under the limitations that exist in
our present knowledge about how to bring about various kinds of learning out-
comes.

It is worth noting that both the Pittsburgh and the ComField approaches
conceptualize the teacher as a behaviorist (all the models do, in fact). The
behaviorist conception requires the teacher to specify learning outcome in
terms of pupil behaviors, and each requires that the teacher attempt to
tailor the environment to the characteristics of the student, and to the
particular kinds of outcomes desired. Whereas, the Pittsburgh model em-
phasized the specification of means for producing outcomes for individual
learners, the ComField model includes individualization as a general aspect
of educational method, but conceives the teacher in more kinds of roles
than Pittsburgh did.

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[1]Northwest Regional Educational Laboratory, _Ibid_., p. 6.

The ComField conception raises a number of complex questions which have to be resolved before their performance model can be fully comprehended. Two of these stand out. First of all, it is not clear whether every teacher is to be responsible for bringing about any learning outcome with an appropriate strategy for every learner. This is a really crucial question, for there are myriad types of learning and a vast number of potential strategies for bringing these about. The model seems to lead to an unmanageably complex functionary.

The partial answer to this is found in ComField's expectations of the future.

In order to plan an instructional program meaningfully, some prediction as to the nature and purpose of education in the 1970's and beyond has to be made. Two predictions have been agreed to by the planners of ComField.

1. A functional science and technology of education will evolve, and it will bring with it an educational program that is markedly different from that which is now found in most schools. Two differences are anticipated: 1) the widespread use of pupil-materials instruction, and 2) the application of systems technology in the design of instructional experiences. Out of both will grow the application of "instructional systems" to the education of children.

2. Three major classes of educational specialists are anticipated: 1) instructional analysts, 2) instructional designers or engineers, and 3) instructional managers. As presently conceived the instructional analyst will be the member of the instructional team primarily responsible for identifying the classes of pupil outcomes for which the school should be responsible, and the instructional conditions that bring them about; the instructional designer-engineer will have the task of developing instructional systems to bring these outcomes about; and the instructional manager (IM), will bring the effort of the first two members to bear upon the educative process. The task of the IM is viewed as one of creating and/or maintaining an instructional environment that brings about learning in children. The IM's specific function within the school is likely to be primarily a supervisor of the instructional process rather than the prime manipulator of it. Operationally this means that while the IM

of the future must be able to diagnose learner readi-
ness, prescribe appropriate learning experiences,
evaluate their effectiveness and prescribe next
learning steps, he must also be able to apply the
instructional systems developed by the other members
of the educational team, supervise instructional
assistants, use electronic and computer media, etc.[1]

Thus, ComField's teacher is an instructional manager who works
in an environment which increasingly consists of student-material
relationships with a presumed vast storehouse of instructional
possibilities which are mediated through instructional systems. This
greatly changes our view of him. Thus, the second question which
has to be resolved involves determining the nature of responsibility
when a teacher supervises rather than manipulates instruction. Is
not the system the primary agent? At times ComField speaks as if
the teacher were the kind of broadly-responsible agent we are familiar
with in the traditional literature of teacher education but at other
times he appears to be one of a large group of supervisory techni-
cians in a kind of large warehouse of self-instructional materials.

Thus, while the model is quite behavioral and unified, there
appears to be an ambiguity which could, if cleared up, improve the
functional quality of the conception. It appears to us that if the
teacher is to work in the kind of environment ComField specifies, then
his role can be defined much more narrowly and thus a more feasible
goal will result.

As these questions are resolved, the model of the teacher will
be in sharper focus and programs to achieve the model will be more
clearly feasible.

The Georgia Approach:
Working from the Objectives of Elementary Education

The Georgia model was developed by conceptualizing a desirable
kind of elementary education and identifying the teacher performance
which would be necessary to bring that kind of elementary education
into existence.

To do this, the Georgia team began with the identification of
seven broad objectives of elementary schools. These in turn were
used to determine the kinds of conditions that would be likely to
lead students toward those objectives. From those conditions the
teacher job analysis was made. ("What should the teacher do to
produce those conditions?" was the question asked.) Then the job

[1]Northwest Regional Educational Laboratory, Ibid., p. 18.

analysis was broken down into specific teaching behaviors. The six goals of elementary education are:

1. <u>Providing the student with the tools of learning necessary to meet his current obligations and for his continued development towards becoming a lifelong learner</u>. Tools include skill in reading, writing, listening, speaking, computation, obser- vation, and the more advanced processes of com- prehension, discrimination, application, analysis, synthesis, and evaluation. Tools, also, include the understanding and appreciation of the arts, and the skills necessary to maintain adequate phy- sical and mental health.

2. <u>Assisting the student to understand his social and physical world</u>. A basic knowledge of the social world includes an understanding of the institutions of society, their interrelationships, and their relationship to the individual. It also includes an understanding of the make-up of society, its religions, ethnic and racial groups, and the in- fluence culture has on the development of the in- dividual. Basic knowledge of the physical world involves knowing how natural laws and one's en- vironment affect the society and the individual, and how one adapts to his habitat.

3. <u>Developing the foundation for good citizenship</u>. Good citizenship consists of an understanding of the democratic process, respect for each person as an individual, and a respect for the rights of others. Knowledge and understanding of the founda- tions upon which the society has been built and insights into the evolutionary nature of society pro- vide the student with a grasp of his own role in the society. Good citizenship further implies that the individual will become a contributing member of the society capable of rational thought and action.

4. <u>Developing the basis for effective human relations</u>. An essential function of human relations in the elementary school is to help the growing child to know and to understand himself and to grow in healthy attitudes of self-acceptance. While learning to accept himself, it is equally important that he learn to understand and accept others and to be concerned for their welfare. He must realize that all society is based on interaction with others, and consequently, that society is healthy and productive insofar as the interaction is healthy and productive.

5. Introducing the process of change and its relation-
ship to the individual and the society. Effective
change is impossible without both the ability to
think and to communicate with others in group situa-
tions. In an era of rapid societal change such as
we are now experiencing, these skills become par-
ticularly crucial. Consequently, the elementary
school must help children to study events, to place
a value on them, and then to make wise decisions as
to their own action in relation to them. They must
be able to glean from the past that which is realistic
for progress in the future. Thus, they must be equip-
ped with the processes necessary for problem solving,
and they must be skilled in the processes of communi-
cation and group interaction.

6. Assisting the student in developing a personal
value system that will enable him to make rational
choices. Man's relationship to other men and to
society as a whole is largely determined by the
attitudes and values that he holds and the worth he
places on them. In this area, the elementary school
has the responsibility of helping the child to
analyze his environment and from this, to discern
those attitudes and values that he can accept to be
true because they are conducive to the common good.
Essential here are the notions of the worth of man,
the value of property, social justice, etc. However,
in an era of rapid change, it is particularly im-
portant that the child be helped to rationally
distinguish what is right, rather than what is said to
be right. Thus, it is essential that the child have
the skills necessary to be aware of the disparities
of human circumstance and the skills necessary to
identify and to correct unsatisfactory notions.
Only in this way can he develop those attitudes and
values that will promote effective citizenship and
progress toward the common good.[1]

The products of neither Phase One nor Two provide us with information
about how these goals were identified, but it is stated that they are
generally agreed on by educators.

[1]University of Georgia, Georgia Educational Model Specifications
for the Preparation of Elementary Teachers, (OE-58019) Washington,
D.C.: U.S. Office of Education, 1968. p. B-4, 5.

The six goals provided the framework from which elementary
school objectives and pupil learning behaviors were identified.
both of these tasks (identifying objectives and pupil behaviors)
were accomplished by specialists within the College of Education
at the University of Georgia. These specialists worked in content
area teams (reading, arithmetic, etc.) which resulted in objec-
tives and pupil behaviors within the framework of the curriculum
areas which characterize the present elementary school. For
example, Figure 3.2 (see page 97) gives an example of the working
procedures used to develop this performance analysis.

Objective

To learn to solve problems.

Pupil Learning Behaviors

1. The child identifies problems.
2. The child formulates hypotheses.
3. The child gathers information.
4. The child analyzes data.
5. The child evaluates alternative solutions.
6. The child generalizes solutions.

Teaching Behaviors

1. The teacher organizes problem situations.
2. The teacher interests pupils in problem and observes its formulation.
3. The teacher observes information gathering and processing.
4. The teacher assists, as required, in developing a solution to the problem.

Suggested Specifications for a Teacher Education Program

A teacher education program will provide the student with:

1. Knowledge of and skill in developing problem situations.
2. Knowledge of and skill in techniques of presenting problem solutions methods.
3. Knowledge of and skill in critiquing problem solutions.

Figure 3.2. Cognitive Processes--Specifications Work Sheet

University of Georgia, Ibid., p. III.

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Consensus of experts was used by the Georgia team to identify the elementary school objectives and the pupil learning behaviors from which the job analysis was derived.

The overall method for developing the specifications is clear enough--teams of specialists identify school objectives, from those desirable pupil behaviors are generated and then, in turn, teacher behaviors and competencies are developed. The result is that the substantive conception of the teacher grows in small pieces. This has advantages and disadvantages. An advantage is that the job can go on in manageable pieces. A team can identify one goal and go straight through until the competencies related to it are identified and matched with performance modules to constitute the substance of the program. This produces a "vertical" consistency of all modules and the overall goals.

There are several problems with this method which can, however, be overcome.

First, the selection of the content areas greatly affects the nature of the competencies which result. What should be the areas? If one weighs philosophy and the arts heavily, the competencies will be weighted on that side. The possible content areas are very large. The process of selection of the content teams should be fully-rationalized and made transparent. In addition, potential relationships among the areas should be made clear. Further, a system for relating the work of the teams to each other needs to be employed so that needless dublication is avoided and the languages of the teams can be related to each other. The Georgia program as it stands doesn't provide a rationalization for the selection of the content areas nor a system for relating the work of the teams (except for a system to make relatively uniform the concepts used to describe specifications.)

As a consequence, the Georgia conception of the teacher is constructed of sequences of small units within separate content areas. Moreover, there is no clear plan for sequencing, so that the relationship among the units must be inferred from examining them.

In the course of implementation these problems should be faced directly and solved. Before performance modules are developed an integrated conception of the teacher should be developed (quite possibly by developing an integrated conception of the goals of the elementary school). The content areas should be rationalized in terms of this unified conception and a system developed for relating the specifications in the several content areas to each other. In addition, systematic plans for sequencing within the content areas would ensure that the units of behavior add up to a solid performance in each area.

In the course of making their analysis, the Georgia team decided that no one kind of personnel could engage in all the behaviors that were being identified, and they were developed into four major categories for elementary school personnel: aide, teaching assistant, certified elementary teacher, and specialist. Each of the levels implied competency at the previous levels, and the four categories provided a career hierarchy for instructional personnel within the elementary school. The education-career combination can be seen in Figure 3.3 (see p. 100).

The Georgia team attempted to achieve behaviorality and standardization of form in stating objectives for the program by specifying for the cognitive, affective and psychomotor domain hierarchical behavioral levels (taken in the first two cases from the Taxonomies of Educational Objectives) and using them to state objectives for the types of teachers (aide, teacher, specialists) identified for the program. For example:

Characteristic	Level of Development					
	Cognitive			Affective		
3.15.16 Curricular	T.A.	Tch.	Spec.	T.A.	Tch.	Spec.
Programs for elementary school science		3	6		3	5

Figure 3.4. Performance Specifications--Science[1]

This means that the teaching assistant requires no development in this area, that teachers do at cognitive level 3 and affective level 3 and specialists at cognitive level 6 and affective level 5. In one sense this device does assure behaviorality and uniformity in the statement of specifications. However, it remains to be seen how general behavioral descriptors (cognitive level 3, for example) can function over a variety of types of characteristics or content. This will have to be worked out in development.

Unity of conception is enhanced by the clarity of the steps which Georgia used to develop its specifications--proceeding from the goals of elementary education straight through to the objectives of the school, behaviors of children, and hence to the behaviors of the teacher. However, by developing the actual specifications through content or curriculum-area teams working separately in their areas, what resulted is undoubtedly a clear job specification of the teacher, which is what Georgia was after, but not necessarily a working model of the teacher. The mass of specifications which resulted--over 2500 in number--need to fit together organically and

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[1]University of Georgia, Ibid., p. III-81

Figure 3.3. Paths in the Teacher Career Field

University of Georgia, Ibid., p. II-5.

it is difficult to tell at this stage of development whether that
will be the case. During fuller development and implementation it
is essential that this be accomplished.

The University of Toledo Model:
The Teacher As a Team Member

The Toledo group developed their performance model by de-
scribing a clinical team of teachers in action and by analyzing
the functions of a team member:[1]

A New Role for the Elementary Teacher

Simply stated, the prime functions of the teacher
are the transmission of knowledge and the transmission
of values. As previously mentioned, both cognitive
knowledge and societal values and norms are becoming
increasingly complex. When attempting to fulfill his
task as a transmitter of values and norms, the teacher
must not only mediate between the child's world and
the adult in an effort to close the ever widening
generation gap, but he must also deal with a serious
cultural gap. The cultural gap is especially impor-
tant when the student's cultural background is mar-
kedly different from the teacher's. When norms are
in a state of flux, as in our attitudes toward sex and
drugs, the teacher may not feel competent to force
his values upon the pupils. When the teacher attempts
to fulfill his function as a transmitter of knowledge,
he is again caught in the web of rapid change. It
seems clear that if the teacher is to fulfill these
two functions successfully, he will need help.

The Teacher As a Team Member

If the elementary teacher is to maximize his
effectiveness in the transmission of cognitive knowlege,
he will need to be a member of a team - a team made
up of specialists. The purpose of the team would be to
design instructional systems. An instructional system
is a strategic complex of human and nonhuman components
which are dynamically interdependent and interrelated
and work together to attain a particular instructional
goal or set of goals. The instructional system receives

[1] University of Toledo, Educational Specifications for a Compre-
hensive Elementary Teacher Education Program (OE) Washington
D.C.: USOE, 1968, Vol. I, pp. 61-62.

3.18

inputs from the external environment, processes these inputs in a prescribed instructional environment according to strategies derived from research and expert opinion, so that the output generated will have a high probability of achieving the prescribed goal or goals. The instructional system components may include some or all of the following: learner(s), teacher(s), mediated instructional materials, assessment and feedback instruments, information processing and displaying machines, support technician(s).

The key to this arrangement is the <u>team</u>. Instructional decisions are made cooperatively by a team of specialists with a master teacher serving in the role of instructional specialist throughout the entire instructional system design process. Each team could serve a number of master teachers. For example, in a building of thirty teachers and nine hundred pupils there could be six master teachers all of whom were served by the same Instructional System Design team.

The membership of the ISD team would vary depending upon the needs and background of the pupils, e.g., a slum school would probably need the services of at least one sociologist or an elementary school near Cape Kennedy might require a specialist in space technology in order to take advantage of the children's knowledge of space science which they learned at home. Some of the specialists that would very likely serve at all instructional systems design would be:

1. Subject matter specialist — To update the subject matter.

2. Curriculum specialist — To determine the mix of what to teach to whom.

3. Research specialist — To evaluate the instructional system's efficiency in terms of the output produced and to collect and feed back data needed to redesign the system; to calculate cost/effectiveness estimates of alternative instructional strategies and systems.

4.	Educational sociologist	To interpret the social and cultural milieu of the child.
5.	Educational psychologist	To study the child's growth and development and his individual learning patterns.
6.	Instructional technologist	To design, develop and test modules of mediated instruction.
7.	Administrative specialist	To meet the administrative and managerial needs of the team.
8.	Information Management Specialist	To develop information storage and retrieval systems, computer based information management system, and computer simulation techniques.
9.	Counseling and Guidance Specialist	To fill the guidance and counseling needs of the students through and with the help of the teachers.
10.	Pupil Evaluation Specialist	To specify in behavioral terms the goals for each pupil, to assess the progress of each individual pupil and to make recommendations to the ISD team for modifications of the pupil's program.

The next step was to develop complete models of each of these roles and to fit them together again in a model of a smoothly functioning team.

Toledo thus imagined, as did ComField and Pittsburgh, a school which is organized in sets of instructional systems and staffed by teams of developers who constantly evaluate and improve the system and work with teachers to tailor learning environments to children.

As in the case also of ComField and Georgia, a massive list of behavioral objectives were developed. The result is a massive list of

"working parts" of the teacher but there is no general, overall description of the functioning teacher which can provide a model-like, unifying structure which can serve to integrate the elements of the program.

Thus, the feasibility of the program would be increased enormously if general models of the team members were built--models that could integrate the enormous variety of job specifications that resulted from the project. The description of the team itself, which provides a good point of departure, is not enough in itself--models of its functioning parts need to be developed.

The Michigan State Model:
The Application of the Behavioral Sciences to Teaching

The Michigan State model gave the greatest emphasis to the teacher as an applied behavioral scientist. The teacher was seen as a scientist in the classroom, creating and testing hypotheses. The Michigan State team's description is directly to the point:[1]

> A key concept of the BSTEP model is clinical behavior style. The major function of this concept is to regularize the behavior of teachers. Clinical behavior style denotes those particular and stylized sets of activities and mental processes which a practitioner possesses. Such a practitioner of education will be specifically trained to utilize his client-related experience as the basis for continuous learning and improvement of his skills as a teacher. The clinical behavior style which is appropriate for a professional teacher consists of six phases: describing, analyzing, hypothesizing, prescribing, testing, and observing consequences. The last phase, observing consequences of the treatment administered, leads in turn to the first by a process of recycling in order to describe the changed situation.
>
> The progressional foundations of the program are centered on the behavioral sciences for two reasons: (a) The dominant task of all educational activity is to develop pupil behavior within various settings. The behavioral sciences provide the systems of knowledge and inquiry most relatable to this task. (b) A distinctive feature of empirical science as a way of acquiring

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[1] Michigan State University, Behavioral Science Elementary Teacher Education Program (OE 58024, three volumes) Washington D.C.: 1968.

knowledge is that it is self-corrective.

The teacher was seen within this concept in terms of three processes: proposing, doing, and reflecting. He would identify problems, propose solutions to them and reflect on the situation. Starting from this view of performance, the Michigan State team proceeded to identify the competencies needed to apply the behavioral sciences to the solution of educational problems. The total number of competencies reached more than 2700 by the time the team had completed the work. The procedures followed ensured a high degree in behaviorality, especially considering the fact that teams worked in the humanities, where a behavioral tradition is not only rare, but often scorned.

The "clinical style" and "applied behavioral scientist" served to unify the program's specifications and provide a kind of working model of the teacher, although the large number of teams which developed the specifications of necessity had to do much of their work separately.

In the feasibility study a management system is proposed which will include clear and rigorous testing of each module to ensure effectiveness and redevelopment. It should be possible to augment this to include a study of the interrelationships of the behavioral elements and their integration into the clinical behavior of the teacher. This would provide for the empirical augmentation of the clinical model and lead to its testing and the subsequent development of procedures to increase the integration of streams of development. We will deal with this question more extensively in the next chapter as we explore ways of increasing the feasibility of program strategies.

The behaviorism and a clinical view of teaching found in the Michigan State model was common to various models as was the range of concepts used. The other model builders, Syracuse, Massachusetts, Florida State, and Wisconsin, shared many elements with this conception.

Massachusetts

The Massachusetts conception of the teacher describes teaching in terms of three components: Human Relations, Behavioral (Teaching Skills), and Content. In itself, this tripartite conception is imaginative, and all three aspects can be defended as important to teaching. Giving such prominence to human relations represents an important contribution to conceptions of the teacher. However, the selection of the three components is not explained, nor are they related to each other. Some philosophical and psychological underpinnings are provided in the human relations area, but not in the others. Thus, a promising idea does not result in a real working model of the teacher, although we believe this problem could be remedied.

Within each of the three areas behavioral elements of teaching
are specified as objectives of the teacher education program. No
provision is made for relating growth in one area to either of the
others. Nor are the skills, knowledges, and values within any of
the areas related according to any general scheme. The eighteen
teaching skills, for example, are not described in any particular
relation to each other nor is it clear how they were selected from
the myriad of possible skills.

The Massachusetts program offers the promise of a model of the
teacher but there is curiously little attempt to capitalize on
this beginning, and the unrelatedness of the behavioral elements is
almost vexing. It should be possible during subsequent stages of
development to increase the power of the program by developing a
more powerful view of the teacher.

The Massachusetts conception makes a strong contribution in
another direction. It is structured so that the program can be
adjusted to persons seeking a wide variety of specialties in dif-
ferentiated teaching staffs. Several types of competency are
identified for each specialist and a profile of performance within
each specialty. Each type of competency is organized in terms of a
sequence of competencies so that students can enter each type at
their level of achievement.

There follows a figure from the Massachusetts report which is
used for a profile analysis.[1] (See Figure 3.5, page 107)

In the Massachusetts profile analysis, profiles are constructed
in several areas for each of several positions within differentiated
teaching staffs. The entering student is matched with the desired
profile for the particular specialty for which he is aiming, and
the diagnosis that results can be used in planning his curriculum.
As in the case of the other modular curricular designs, the Massa-
chusetts model links specific learning objectives with instructional
alternatives, and the selection of these can be made in relation
to the specialties for which the candidate is preparing.

Syracuse

The Syracuse program is structured around a conception of
teaching which is to characterize both the teacher who emerges
and the program to prepare him. This conception is an "intent-
action-feedback-process" model.

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[1]University of Massachusetts, Model Elementary Teacher Education
Program (OE 58024, two volumes) Washington D.C.: USOE, 1968,
p. 84.

Figure 3.5. Massachusetts Profile-Analysis Chart.

The model program is seen as functioning according to the
following patterns. The demands of a changing world will make
demands on the program for some kind of relevant response. In
the pluralistic situation, we believe there will be a diversity
of proposed responses relevant to the situation. This diversity of
possible responses will lead to confrontations in an open, inquiring
climate. The better alternatives should ultimately prevail. These
alternatives will be translated into what have been defined as re-
sponsible behaviors, and are characterized as:

A. Intending   Intent

B. Acting on the basis of the
    intention   Action

C. Accounting for the consequences
    of the action   Feedback

D. Using the results of the
    accounting to modify future
    intents and actions   Process

The substantive conception of the teacher within the frame-
work of this model is described in terms of seven components, one
"liberal" and six "professional."

The Components of the Model Program

The model program is designed as a five-year program. The
first two years are devoted to liberal studies. The junior year
begins exploratory professional study and continues liberal studies.
The senior year is devoted to full-time professional study. The
final year, including the summers preceding and following, is
seen as a resident year and a period for developing and refining:
(a) skills and knowledge learned in previous years, and (b) a
specialization that is unique for each student.

The seven components of the program are integrated into the
basic design of the total program. These components are: (a)
Liberal Education, (b) Methods and Curriculum, (c) Child Develop-
ment, (d) Teaching Theory and Practice, (e) Professional Sensitivity
Training, (f) Social-Cultural Foundations, and (g) a Self-Directed
Component. The staff developing the model composed of these com-
ponents provided an excellent test for the workability of the
pluralistic assumption about the nature of reality in teacher edu-
cation. The components are diverse in nature and character. The
full range of their diversity will be more apparent in subsequent
chapters of this report which spell out each component more fully.

The specification of the behavioral elements which make up the
teacher is carried on in the development of the seven components.
Thus, the behavioral description of the teacher emerges as the com-
ponents are developed. The intent-action-feedback paradigm serves
to unify the work and to provide some model-like quality to the
overall product. Nonetheless, the process results in a mass of
behavioral elements which then have to be integrated rather than
being elements which result by breaking down or task-analyzing an
overall model.

As in the case of Michigan State, the Syracuse Model can pro-
vide, during development, for the creation of a more complete
working conception of the teacher and this will greatly enhance the
feasibility of the program.

Nearly all the models, as mentioned previously, employed be-
havioral performance analysis to affective as well as cognitive and
skill domains and Syracuse included a large number of examples. The
following is a statement of educational objectives for a module
relating to affective behavior.

TTP-7:   Educational Objectives for Affective Behavior

   I. Prerequisites: Completion of TTP-5.
       Concurrent with tutorial experience in
       the public schools.

  II. Placement of Module: Junior, pre-
       professional year.

 III. Estimated Time: Student time - 4 hours.
       University faculty time - 0 hours.
       Clinical Professor and Clinical Teacher
       time - 0 hours.

 IV. Operational Objectives: The purpose of
       this module is to develop the ability
       to discriminate between statements of
       educational objectives describing different
       levels of personal involvement, attitudes,
       motivations, values, etc., and to write ob-
       jectives for lessons and curricula which in-
       clude these types of outcomes. The general
       objectives of this module should prepare
       the student to do the following:

       A. Recognize and discriminate between
          statements of educational goals describing

the affective characteristics of children (as
distinct from the other objectives already studied)
as inferred from watching specific types of be-
haviors.

B. Write and justify the appropriateness of state-
ments concerning the affective outcomes of
lessons and curricula.

If these broad objectives are achieved, the student should,
for example, be able to do the following:

A. When given a list of educational objectives, inclu-
ding the types of objectives studied in preceding
modules and the different types and levels of af-
fective behavior, be able to identify each and state
the criteria for discriminating between them.

B. Given a case study description of an elementary
classroom, including the characteristics of the pupils,
be able to prepare a set of educational objectives for
the class and individual pupils for at least three
levels of affective involvement, such as:

    1. Being willing to attend to the stimuli
        of the situation.
    2. Responding when directed.
    3. Consistency of self-initiated responses,
        at least within the limited regions of
        activity, etc.

C. Be able to relate a taxonomy of affective behavior to
    the various types and levels of attitudes, (towards
    self, others, objects, and activities), motivations
    (affiliation, achievement, power, avoidance of
    failure) interests, and values.

D. When asked to prepare a set of affective objectives
    for the child with whom he is working in a tutorial
    relationship, prepare objectives for at least one
    area of the child's activities, including at least
    three levels of pupil involvement. Justify the im-
    portance of these objectives for the child, school,
    and society.[1]

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[1]Syracuse University, Specifications for a Comprehensive Under-
graduate and Inservice Teacher Education Program for Elementary
Teachers (OE 58016) Washington D.C.: USOE, 1968. pp. 245-246.

This example shows not only a type of behavioral analyses in the
affective domain, but the emphasis on reflective thinking by the
teacher that characterized the intent-action-feedback paradigm. The
behavioristic description of the teacher did not ordinarily imply
a mechanistic-behaving teacher, but one with fluid, adaptable capa-
bility.

Syracuse also described the teacher as a member of a team,
working with support teams and with a great variety of instruc-
tional systems and specialists available to him. This matrix is
not fully described, but again we find the teacher in a very dif-
ferent role than in the average present-day elementary school.

Florida

The Florida State University conception of the teacher was
arrived at in an attempt to break down the tasks of teaching into
identifiable parts which could serve as the unifying goal of the
program. (See Figure 3.6 on page).

The extent of rationalization of the Florida conception of the
teacher was unusual--the development team clearly was making a
serious effort to develop a model of a functioning teacher and re-
late the parts of that model to one another.

The long quote that follows describes their conception of
the teacher and its justification:

> Five categories of teacher behaviors were identified
> as basic to all elementary teaching. They are stated
> here in their most abstract form. The first four are:
>
> 1. The teacher will plan for instruction by form-
>   ulating objectives in terms of behavior which is
>   observable and measurable.
>
> 2. The teacher will select and organize content ap-
>   propriate to specified objectives in a manner con-
>   sistent with both the logic of the content itself
>   and the psychological demands of the learner.
>
> 3. The teacher will employ appropriate strategies for
>   the attainment of desired behavioral objectives.
>
> 4. The teacher will evaluate learning outcomes on the
>   basis of changes in behavior.
>
> These four behavior categories are integral parts of a
> regenerative or cybernetic conception of teaching in
> which both long range and immediate knowledge of results
> serves constantly to modify the direction and shape of
> the teaching act.
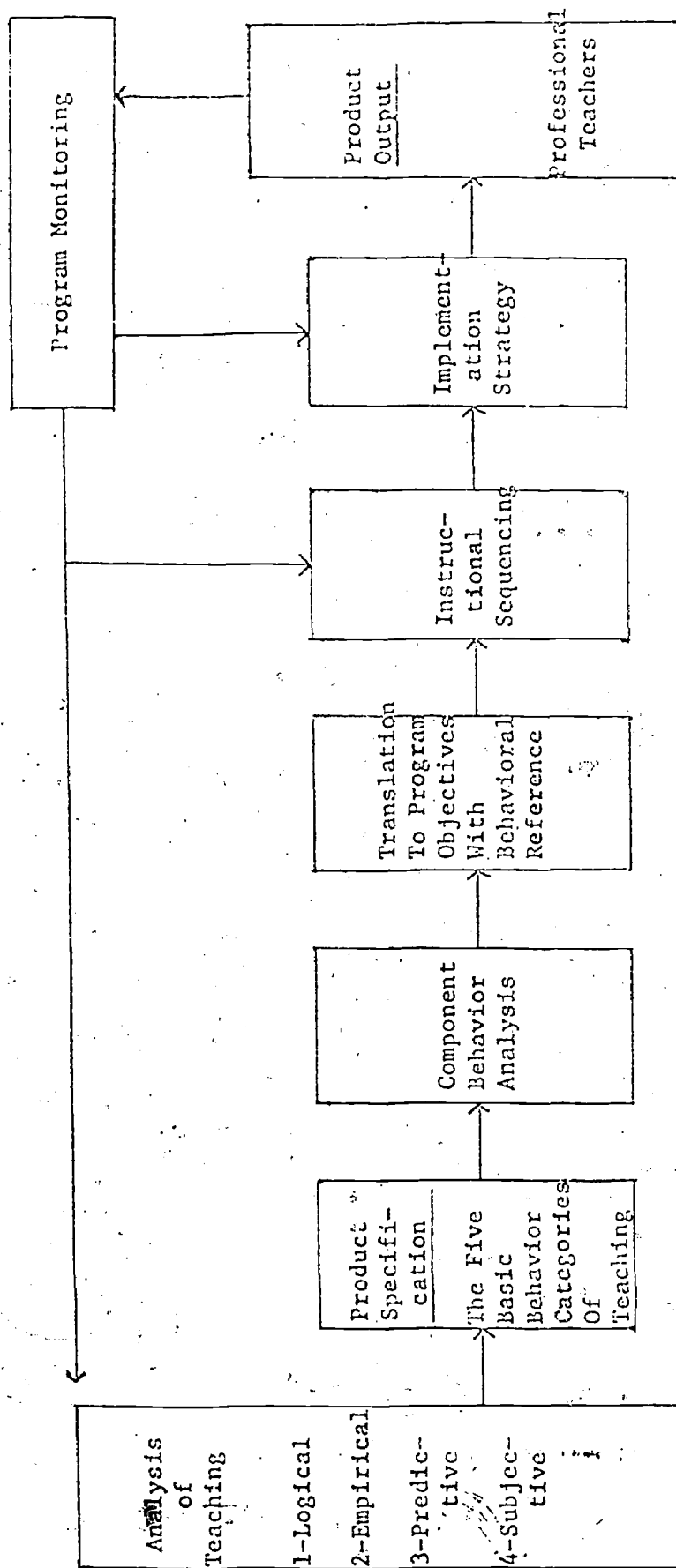
Figure 3.6. A Model for Rational Program Development

Florida State University, A Model for the Preparation of Elementary School Teachers (OE-58018) Washington D.C.: USOE, 1968, p. 36.

The fifth category of behaviors was of a somewhat different order:

5. The teacher will demonstrate an acceptance of leadership and professional responsibilities and demonstrate the ability to serve as a professional leader.

It takes little imagination to visualize all of these steps being followed by persons carrying out the teaching function, whether it is seen as that of an indirect facilitator of pupil learning activities, as the diagnoser of pupil needs and prescriber of pupil learning experiences, or as a direct transmitter of information to pupils via lecture. It seems likely that any approach to influencing the learning of others will demand competent performance in all five behavior categories.

While the chapters which follow contain detailed descriptions of the component breakdown of each of the five basic behavior categories, it is necessary at this point to explain the rationale for describing teaching in these terms.

It was decided that a regenerative model was the only realistic conceptualization which adequately provided for dealing with the infinite variability of learner responses. There is always the distinct possibility that the performance of highly precise and repetitive teacher behaviors will become a more important consideration than coping with learner response variability. In order to avoid this, all instances of verbal and non-verbal feedback must be recognized and interpreted by the teacher who is skilled at constantly modifying his own performance of teaching to maximally influence the learner.

Four behavior categories constitute broadly-conceived basic teaching tasks. In a very real sense, the formulating of objectives, the selection and organization of content, and the choice of appropriate strategies can be conceptualized as pre-active tasks. That is, they are tasks which must normally be performed prior to any actual interaction with a learner, although under some circumstances, the execution of certain strategies may call for the involvement of learners in planning activity.

Planning for instruction is, of course, an essential prerequisite for all types of teaching. Although it is conceivable that instruction could proceed with

objectives unstated, it is inconceivable that meaningful
instruction could long proceed without a purpose. Follow-
ing systems approach requirements demand that purposes
(in the case of teaching, instructional objectives) be
explicit and specific, with the assumption that only in
this way can decision, execution, monitoring, and re-
generation be accomplished with precision. For this
reason, the statement of instructional objectives in
terms as precise and behavioral as possible was a process
utilized both in model program development, and in
describing the basic tasks of teaching.

It must be acknowledged that a strong case can be ·
made for the inclusion of other types of objectives,
such as those which call for no more than exposure of
a learner to natural elements within the environment,
without specification of explicit expected outcome.
Such ideas will ultimately receive attention in training-
ing, particularly during in-service years. However, ·
for pre-service training, the use of a behavioral model
holds the strongest promise as an organizing concept ·
since it expedites acquisition of the knowledge and
skill needed for initial entry into teaching.

The statement of objectives in behavioral terms faci-
litates elements of other basic tasks, such as the sys-
tematic selection of content for learning. A teacher who
has learned to apply principles of selection will care-
fully diagnose learner characteristics and will consider
the logic of specific content. He can apply these prin-
ciples in such a way that learner interaction with that
content will be enhanced. Teachers have traditionally ·
played a significant role in structuring content for
particular learners. The teacher of the future is likely
to play a somewhat different role with respect to the
selection and organization of content. A trend toward
use of multi-media, including pre-packaged programs for ·
individual learners, suggests a teacher role which is
less that of a developer of instructional programs,
and more that of an assessor and adaptor of pre-
packaged programs. Either role demands that selection ·
and organization skills be highly developed, and that
considerable practice in examining, selecting, and
utilizing a wide range of available content material
be provided.

At some point, the teacher must decide on a strategy
tegy for arranging and controlling the conditions of the
contact of learner with content; and then implement what-
ever strategic interaction he has selected. The model

program treats factors underlying both the pre-active
behaviors needed for strategy selection and the inter-
active behaviors involved in strategy implementation
under the single behavior category of "strategy."

Strategy selection requires the teacher to make
decisions about what kind of learning is involved, what
environmental arrangements are most likely to promote
the most productive involvement of a given learner with
selected content. These pre-active decisions must be
made if teaching is to be performed scientifically
rather than haphazardly. Thus, the model program pro-
vides specifications for a sound theoretical decision
base and for practice at reaching such decisions.

The ability to execute strategies, once selected,
is a major goal of the model program and is considered
a key to the successful performance of all types of
teaching. Teachers must be able to arrange two basic
kinds of strategic interactions: (1) non-personal
interactions, and (2) interpersonal interactions,
including both content-oriented and functional inter-
actions.

Non-personal interactions require the teacher to
arrange the physical invironment so that the content
is mediated through some non-personal means, such as
the surroundings (as in a field trip), or some item on
the media list, such as books, still and moving pic-
tures, charts, audio equipment, laboratory models, and
materials. Recent research activities give promise of
providing useful guidelines which will assist the teach-
er in selecting and structuring student involvement
with the non-personal medium most appropriate for a given
learning situation (Briggs, 1967).

Interpersonal interactions of the content-
oriented type refer to those in which the learner inter-
acts with another person (usually the teacher) in a
situation where the focus of the interaction is the
content selected to further some instructional objective.
Under this heading go behaviors often classified as
instructional techniques or the "technical skills of
teaching" (Stanford Center, 1967). These behaviors
involve the execution of particular verbal and non-
verbal tactics designed to evoke particular responses
from students, to provide or secure feedback which
can be immediately processed by teacher or students,
or some similar purpose.

A second type of interpersonal interaction, which
for these purposes is termed "functional interaction,"
refers to those interactions which are not primarily
tied to the content selected for some instructional
objective. Under this heading are found techniques
for assessing and improving the physical conditions of
the learning environment and for setting a psycho-
logical climate conducive to learning. Because rein-
forcement techniques have been proven crucial to the
modification of behavior (Spaulding, 1964; Becker,
1967), and because the reinforcement concept is
generally unrelated to the specific content of in-
struction, reinforcement skills are treated independently
from other strategies and included under the functional
interaction category.

To the same extent that a teacher performs certain
tasks pre-actively and interactively as he seeks to
influence learning systematically, he must also con-
sider post-actively the results of his efforts. A
conceptualization of evaluation which includes a for-
mative (regenerative) function is fully compatible
with the classic summative function which furnishes
information in the form of grades and ranking.
Teachers must evaluate the outcomes of instruction for
the purpose of modifying the course of instruction, as
well as to provide information relative to learner
status and progress (Wilhelm, 1967). The instructional
objective, considered first as the sine qua non of
planning, serves also as the basis for evaluation since
it has been precisely stated in terms which facilitate
observation and measurement. A wide range of skills
must be acquired in order to evaluate the outcomes of
instruction for the full range of purposes.

The fifth major dimension of teacher behavior, in-
volving professional responsibilities and leadership,
cuts across all other tasks and adds to the performance
of teaching that quality which sets it apart from more
inert activities. The component behaviors of this fifth
behavior dimension receive somewhat less emphasis during
the pre-service phase than in the in-service phase of
training because of the more urgent priority of instruc-
tional and management skills and because of a readiness
factor which cannot be assumed until there is input
from experiences gained while carrying out full teaching
responsibility.

In this category are skills related to handling of
one's emotional behavior and development of a personal

teaching style; skills in handling inter-personal relation-
ships with colleagues within the profession and with persons
and agencies outside of the profession; and with skill in
interpreting, assessing, and applying results of educational
research. All three of these areas are intimately inter-
related and are necessary for a teacher who is to be an
agent of change, and who will be able to adapt to changing
conditions.[1]

Working from this unifying conception of the teacher the Florida
team was in a position to make a task analysis of each of its com-
ponent elements and maintain program unity and be sure that developed
elements would fit closely into their model of the teacher.

This feature of the Florida program should be maintained and
extended during development. Also, the conception of the teacher is
flexible and provides for the incorporation of contemporary educational
knowledge and skills - which is important for the actual elements
which were developed by the Florida team were far less innovative than
their conception of how to build a future-related program.

Summary

Figure 3.7 (see page 118) provides a rough comparison of the
prominent features of each conception of the teacher. All concep-
tions shared the following features:

1. The teacher was not only described in behavioral terms, but
   was seen as a behaviorist; a setter of behavioral objectives,
   user of behaviorally-oriented teaching strategies, and user
   of behavioral measurement techniques. There were no exceptions
   to this.

2. The teacher was seen as a member of a clinical team, rather
   than as a lone operator in a self-contained classroom. Spe-
   cialists were envisioned in most cases.

3. The teacher was seen in most cases as working in an environment
   rich in support systems, especially self-instructional materials.
   Thus, he functions as a diagnoser and orchestrator rather than
   as the typical teacher of today.

Shared Conceptions of the Teacher

      1. Behaviorist
      2. Team Member
      3. Diagnoser and Orchestrator

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[1]Florida State University, Ibid., pp. 35-41.

Figure 3.7. Essential Features of Conceptions of the Teacher

Pittsburgh	ComField	Georgia	Toledo
Individualizer. Orchestrator of self-Instructional	Teacher who can produce learning.	Teacher who facilitates ideal pupil behaviors.	Team member (a corporate conception).
	Orchestrator and facilitator of wide range of materials and strategies.	Team member (hierarchical teams).	Uses behavioral techniques to function within support systems and work with large range of goals.

Michigan State	Massachusetts	Syracuse	Florida
Clinical Style--Applied Behavioral Scientist	Human Relations--Content-Behavioral Skills Conception	Intent-Action-Feedback Paradigm	Behaviorist--Hypothesis-tester
Hypothesis-tester using behavioral techniques	Behaviorist, Team member and specialist	Behaviorist and Team member	Team member and orchestrator of materials

Both the activities and the performance criteria of all the
models manifest a concern with an emerging future. The documents
so frequently refer to the inadequacy of our present knowledge about
how to educate children that you might suppose that the teams were
obsessed with feelings of ignorance as they prepared the models.
There was a determination to develop a teacher who would join in
the battle against ignorance. He would act as a hypothesis-tester,
as one who would propose objectives for students, who would define
the conditions likely to achieve those objectives, who would bring
about those conditions and evaluate the outcome, and then would
set to work again on the basis of what he observed. Although the
styles of specification varied greatly, the teacher was seen in all
cases as a member of a clinical team which would use the tools of
the behavioral sciences to clarify objectives and to generate theses
about the kinds of conditions that would achieve them. As an eval-
uator, also, he was seen as a behaviorist, using the techniques of
social science to attempt to determine the results of his efforts.

In the affective and human relations domains also the behavioral
sciences were very prominent. The teacher was seen as relating to
other professionals, and it was assumed that it would be possible for
him to receive the clinical training that would help him relate to
others productively and that he would use knowledge from the behav-
ioral sciences to guide his work with peers and community members
as well as his students.

The teacher, then, was conceived as an applied scientist who
would help create his field as well as practice on the basis of its
present knowledge.

Implications for Teacher Education: Commonality and Variability in Models of Teachers

The developed performance models reflect an implicit consensus
about the most productive roles for the teacher today:

a. As an applied scientist (one who helps find the answers) and
    a behaviorist.

b. As a team member (a colleague and a specialist).

c. As a decision-maker and clinician (a strategist with a
    range of competencies).

d. As a change agent (and one whose personality can cope
    with change).

e. As a manager of instruction, orchestrating vast amounts
of instructional material and support systems.

f. As a behaviorist--a "systems" man in his own right,
setting behavioral objectives, breaking down learning
tasks into their elements, and selecting learning
activities and evaluation devices tailored to a range
of students and differing kinds of learning.

In other words, no one developed a fixed performance model of the
teacher - he was seen as one emerging and growing with the times
and his own development. All saw behavioristic modes of planning
and training as compatible with humanistic, affective goals, and
with training to function in the humane domains. In fact, all
saw behaviorism as the best avenue to a more humanistic as well
as a more efficient education for children and teachers alike.

Hence, all of these systems planning teams denied the fa-
miliar assertion that systems planning techniques and humanistic
education are incompatible.

The wide range of approaches to the development of the per-
formance models included:

a. conceptions of individualized and personalized education
(several models, with Pittsburgh giving this conception
a major focus).

b. conceptions of teachers as people who make educational
decisions, implement them, and get results. (ComField
is most direct with this conception, but it is shared by
all models to some extent, and the "clinical style"
from the Michigan State Model focuses an enormous array
of modules.)

c. conceptions of teachers as changers of educational
institutions. (Especially heavy emphasis by Syra-
cuse and Massachusetts, with Teachers College giving
its entire conception to an innovator, and Florida and
ComField providing linkages to schools through schools
especially committed to innovation.

d. conceptions of interpersonal and affective behavior
(Syracuse and Massachusetts were most explicit here).

This wide range (which appears wider the closer the examina-
tion) belies the notion that systems planners tend to produce
homogeneous conceptions of goals and means. The products re-
present an especially wide range of alternative goals that can be
used by second-generation planners to make available, within

training programs, different conceptions of education and teacher
education. A second-generation effort in this field can capitalize
on the diversity represented here and a map of alternative perfor-
mance models should gradually emerge.

On the other hand, the conceptions were greatly lacking as
working models of the teacher. Rather than developing an over-
arching conception which was then broken down into behavioral ele-
ments, most of the teams used very general theses about the teacher
and working teams did most of the work of developing behavioral
descriptions. Thus the majority of the actual behavioral descrip-
tion of the teacher resides in masses of behavioral objectives.

We consider it vital that more complete and functioning working
models of the teacher be created as the programs are developed and
implemented. As much as is possible, the performance models need to
be:

1. Dynamic models which can unify vast, complex programs and give
   clear guidance to developers. (The Pittsburgh Model is very
   strong here.)

2. Rationalized conceptualizations which relate the components of
   teaching to one another and, thus, lead naturally to related
   program components. (Florida State's conception is heuristic.)

3. Clearly related to the systems which surround the teacher--
   material, other personnel, support systems, and decision-
   making systems. (The ComField Model is heuristic in this
   regard.)

4. Provide some guidance for the task analysts who will break
   down the major elements of teaching behavior into a clarified
   system of objectives. (Toledo provides a useful example here.
   Its description of the teacher provides clues for analyzing
   and sequencing behaviors. Georgia does also, but to a lesser
   extent.)

In addition, development needs to ensure that a much wider range
of theories about teaching enter the models which tend at present
to emphasize very direct, presentational methods of teaching. Many
other strategies are alluded to and there is room for them in the
form of the programs, but the conception of the teacher needs to
make much wider and more imaginative use of a vastly broader range
of teaching behaviors than has so far been the case.

All of the programs use a modular curriculum organization; the
training of the teacher is organized in sets of units each contain-
ing specific objectives, alternative activities, and evaluation pro-
cedures. To this extent they employ a common strategy, one which can-
not be implemented for a large number of students unless it is accom-
panied by contemporary management technology to relate the modular units
to students and provide feedback about the progress of individuals and
the successful and unsuccessful elements of the program. Within the
common modular approach there is room for many strategies of learning
and a wide range of content. A series of analyses were made of the
program strategies and these are reported in this chapter in the
following order:

1. A classification of program components by content.

2. An analysis of ways of increasing program unity and decreasing
   fragmentation within modular structures.

3. A discussion of the use of cybernetic psychology and simula-
   tion in systems approaches.

4. An identification of promising practice for personalizing the
   education of the teacher in managed, modular curricula.

5. An identification of strategies for improving several of the
   models on their own terms.

A Classification of Program Components by Content

We will begin by comparing the programs in terms of the gross content and strategies components that make them up. Because an important consideration in implementing the programs is the extent to which their components differ from the components ordinarily used in teacher education programs, Table 4.1 (see pages 125-126) is constructed to permit a comparison of the content of the model components with those typical of teacher education programs in recent years. The chart also includes an estimate of the distinctive approach of each program.

Georgia was selected as representative of the programs of relatively homogeneous modular structure, which include Toledo and Florida State. Michigan State was selected because it deals in great detail with a comprehensive four-year liberal arts/professional training program. Syracuse and Massachusetts represent less homogeneous training programs which also characterize ComField and Wisconsin.

To make the chart, the components of the approach described by Lindsey and Stratemeyer[1] as the recommended or prevailing program of recent years were identified. Then, Michigan State components were identified. Those the same as the traditional ones were identified as such and those that differed were added to the list. The other programs were treated in a like manner, resulting in a list of all components arranged so that it was clear which components appeared in one or more of the programs.

In addition, the general approach of each component (its teaching strategy) was noted. For example, the Syracuse "philosophy" component employs "seminars and readings" as its strategy. The "behavioral" component from the Massachusetts model uses "micro-teaching and feedback."

In addition, several general strategies were employed to a great extent in several of the programs. One we characterized as a "modular, performance-oriented approach with self-pacing by the student." Where this strategy was used, a check mark ($\checkmark$) appears. In addition, if the student is given options that "personalize" instruction as well as pace it, the check is crossed ($\cancel{\checkmark}$). Thus, in the Massachusetts model, the "science" component is modular, personalized, and uses a strategy of laboratory workshops and courses.

Looking over the chart, it appears that most of the new programs included the components of the Lindsey-Stratemeyer approach, but included some others as well. A few of the "traditional" components missing in the present models will no doubt appear as the development phase continues. Presently Georgia includes physical education but the others don't. Almost certainly, however, the others will decide to provide physical education, as development takes place.

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[1] A. Margaret Lindsey and Florence B. Stratemeyer, Working with Student Teachers, New York: Bureau of Publications, Teachers College, Columbia University, 1958.

The programs have distinctive characteristics that color all their components. For example, the Michigan State program is held together by its massive storage and management system. This system makes all program elements visible to all faculty and students and permits various program changes to be made easily. As some of the other models are further developed they will use similar systems. Syracuse is characterized by the intent-action-feedback paradigm (described in Chapter Three), which provides students and faculty with continuous knowledge about the appropriateness of actions and outcomes to intentions. Various permutations of micro-teaching anchor the Massachusetts approach which also has big helpings of human relations training throughout. Georgia is characterized by its steadfastly modular approach and behavior-modification training techniques.

The great similarity of program content to traditional programs should make implementation easy on one count, since the programs bring relatively little new content to teacher education. On the other hand, it is odd that a larger variety of components did not arise from the effort to create new teacher education programs.

Odd, that is, unless one considers that in most cases the projects to create the models were organized in teams according to the traditional component areas. As pointed out in Chapter Three, most of the model-builders did not construct a general model of the teacher and then break it down into component elements. Rather, a general idea of the teacher was created as a guideline to the development teams (as the Clinical Style of the Michigan State approach) and then teams, already organized according to major areas of development, proceeded to work constructing the behavioral elements (objectives) of the program and the activities which would be related to them. Thus the organization of the projects predetermined that most program components would be traditional. Only when a development team was organized to include new areas (as Massachusetts with "behavioral" and "human relations" components) could they arise.

However, the program strategies uniformly included a modular organization. This is the major departure from the traditional procedures and permits an individualization and personalization not remotely possible in the seminar/course/practice-teaching structures of the traditional programs. Also, conceiving the teacher as a behaviorist (see Chapter Three) greatly influenced specific program content.

Against Fragmentation: A General Feasibility Problem

In large modular program structures a persistent problem is to establish relationships among modules so that the environment which is presented to the student has an integrated and coherent character.

Soltis suggested that the program models could be classified as:

1. "Atomic," in which modules as presently specified appear to be almost completely independent of each other except for

Table 4.1. Program Models by Content of Component, Characteristic Approach, and Comparison with Typical Teacher Education Programs.

Component	Typical Program	Michigan	Syracuse	Massachusetts	Georgia
(Characteristic Approach)		(Clinical Style)	(Intent-Action-Feedback)	(Micro-Teaching, Human Rel. Train.)	(Job Analysis, Elementary school goals)
Human Relations		✓	√Semi-programmed texts, Feedback tape analysis	√Interview, Analysis, Self-awareness training	
Behavioral		✓	√Seminar, Problem packet seminar	√Micro-Teaching & Feedback	√Specified in all components (affective)
Aesthetics	Courses, Observation, Development of units	√Workshop, Readings, Writing, Discussion to compare aspects of issues		√Demonstrations, Personal exploration	√Lab
Language Arts	"	✓ "	√Modular instr., Self-instr. from programmed mat'l	√Micro-teaching, Classrooms-learning center	√Lab
Social Studies	"	√Real & simulated sit'ns employing decision-making modes of social scientists	"	√Use of model from Social Science	√Lab
Science	"	√History of man's view of world-patterns of science	"	√Lab, Workshops, Courses	√Lab

Subject					
Mathematics	X	"	"	√Programmed texts, Lectures, Videotape, Discussion groups	√Lab √
Foreign Languages		Q		√Programmed text, Language house, Radio & TV, Travel	√Lab
Pre-School			To be developed	√Self-awareness encounters, Clinic, Children's home	Lab
Evaluation	Course work in lab, Observation	X Assessment, feed-back, Built-in checkpoints	√Seminar, Problem packet seminar		Specified in all components
Media		Graduate level X	√		√
Supervision				√Simulation, Videotaping, Micro-teaching, Programmed instruction	√
Child Development (Human growth & Development)	Course work, Lab experience, Obser-vations	√Environmental systems of pupils explored, Study of school as social institution	√Seminar, Anal-ysis of videotapes		√
Philosophy			√Seminars, Readings		√
Health and Physical Education					√

Table 4.1. Continued

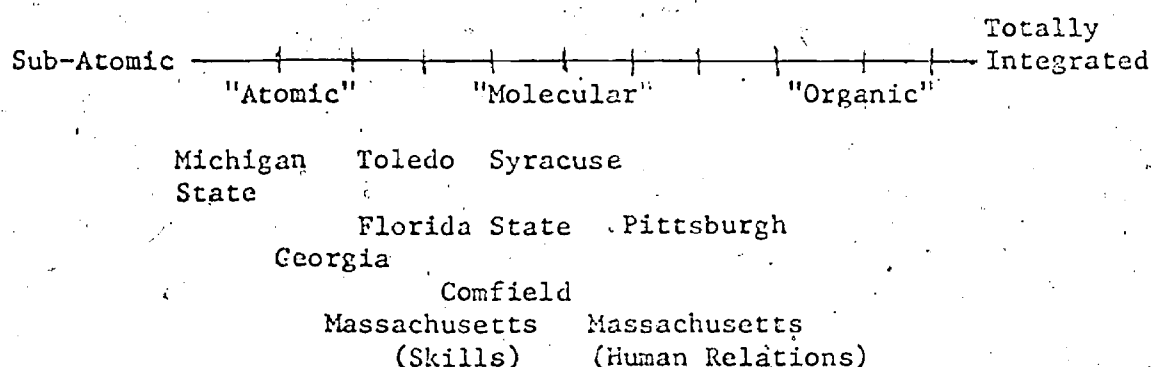| Component	Typical Program	Michigan	Syracuse	Massachusetts	Georgia
Laboratory Units (Clinical experiences, Student teaching, Internship, etc.)	Student Teaching (Fulltime for 1/4 of school year)	√Tutorial, Seminar, Team-teaching, and Internship (1 yr.)	√Choice and use of Instructional materials, part-time student teaching senior year, Activity in teaching centers	Internship until competence	√Internship
Additional elements		3 main components Liberal education, Prof. use of knowl-edge, & Scholarly modes of knowledge		Alternative routes always provided	

their common membership in a management system.

2. "Molecular," in which there are some connections or systems for integration, but the integrated clusters are not connected with one another.

3. "Organic," in which they are explicitly related and seen in terms of interrelated functioning in the individual.

In our view the organic level is most desirable and increases the feasibility of a model from the point of view of all parties.

It cannot be achieved without an integrated, working, "performance" model of the teacher. As indicated in Chapter One, only Pittsburgh of the eight models which we analyzed remotely approached a working model, and that was achieved with a narrow, specific view of the teacher (not a criticism!) which many might not accept or, if they did, might feel should be complemented by other types of teachers.

Thus, most of the models would have to change their conceptions of the teacher in order to be able to organize their program organically. The remainder of the programs we classify as follows:

Figure 4.1. Programs Classified by Integration
of Modular Elements

```
                                                      Totally
Sub-Atomic ──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼── Integrated
        "Atomic"       "Molecular"      "Organic"

   Michigan    Toledo   Syracuse
   State
              Florida State   Pittsburgh
        Georgia
                  Comfield
           Massachusetts    Massachusetts
             (Skills)      (Human Relations)
```

Integration of elements can be achieved in several ways by designing types of linkages which can be used, during development, to specify interrelationships among program elements.

The Syracuse Model had several devices which could greatly enhance the integrated nature of several of the other programs. This was especially true of Michigan State, which with its useful storage system, could advance its entire structure to the molecular and perhaps the organic stage, simply by employing this device, if the linkages were related in turn to the "clinical style."

The Modular Flow Chart of the Syracuse Model (Figure 4.2, see page 129) illustrates their system for relating clusters of activities pointing to an objective or group of objectives. It serves, during development, as a system which reminds the developer of the range of activities available to him and helps him relate a variety of modes of instruction to each other to develop a particular competency or group

Figure 4.2. Modular Flow Chart TTP-16

Sequence of Activities
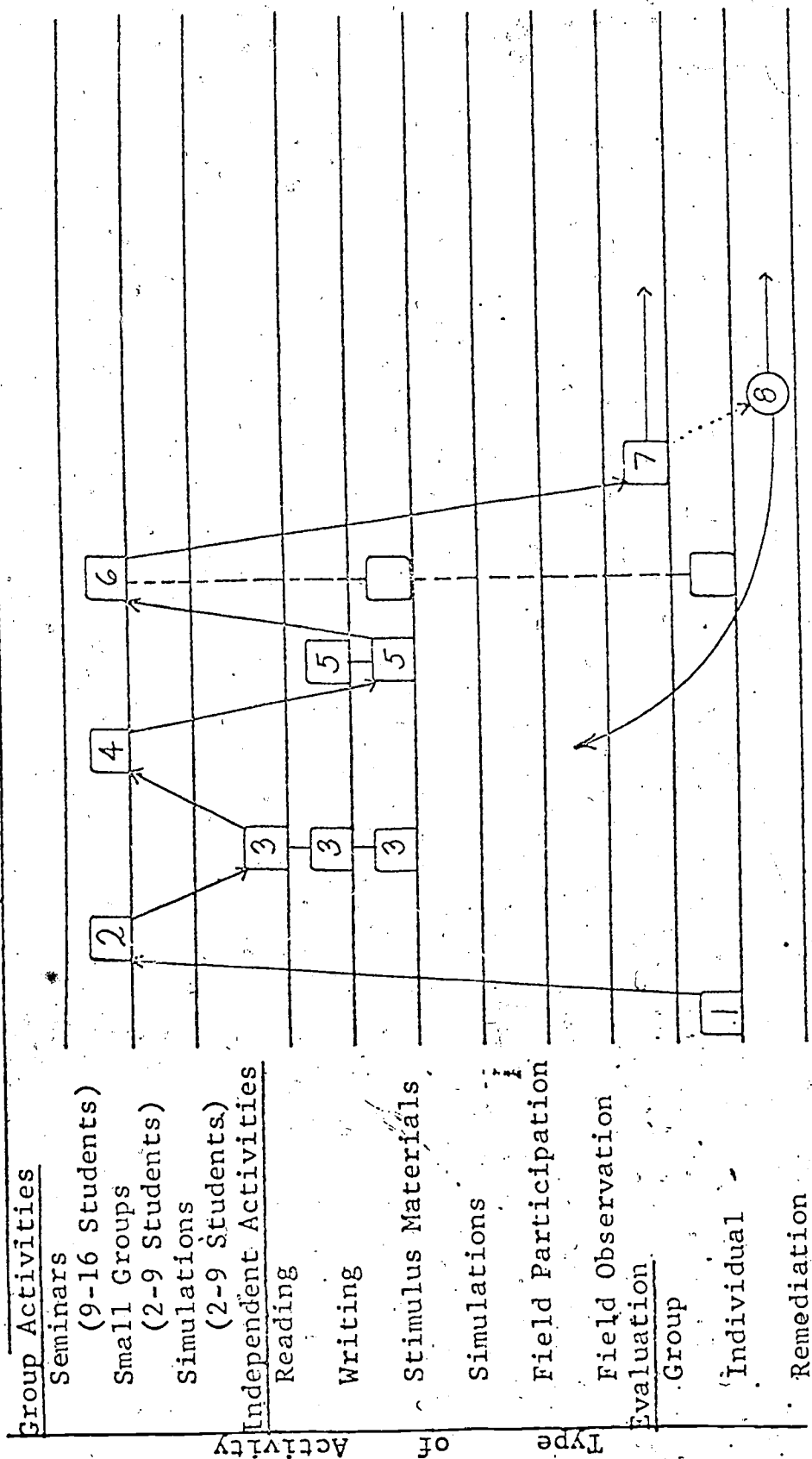
Group Activities
  Seminars
    (9-16 Students)
  Small Groups
    (2-9 Students)
  Simulations
    (2-9 Students)
Independent Activities
  Reading
  Writing
  Stimulus Materials
  Simulations
  Field Participation
  Field Observation
Evaluation
  Group
  Individual
  Remediation

Type of Activity

Syracuse University, Specifications for a Comprehensive Undergraduate and Inservice Teacher Education Program for Elementary Teachers (OE-58016) Washington D.C.: USOE, 1968, p. 282.

of related competencies.

Such devices could relate activities pertaining not only to one domain of development but to several. For example, in the Massachusetts Model, sequences of activities within the behavioral, human relations, and content areas could be related to each other through an augmented system such as was used by Syracuse.

In a sense, what this type of device does is ensure that the concept of module includes only meaningful units of activities so that the student is not thrown into a mass of activities over objectives too small to be functionally meaningful.

There are several other ways in which well-developed elements of some models can be employed to enhance the structure of other models.

Simulation and Cybernetic Psychology

Most of the models provide explicitly or implicitly for considerable use of simulation in training activities. ComField is especially thorough in the integration of a teaching laboratory throughout the program and represents the most elaborate description of the use of simulation throught teacher education to date, although much specification remains to be done.

The rationale for the use of simulation is that "situations less complex than the reality of the classroom" permit the teacher to master skills which are very difficult to learn in the taxing chaos of the classroom and, derivatively, help him prepare for that complexity by achieving competency before taking responsibility for the education of children.

Simulation, despite its limited use to date in teacher education, has been used with considerable effectiveness in the training of such complex personnel as airline pilots and high-level military tacticians. There is little doubt of its potential in the training of teachers.

In all previously successful uses of simulation the basis of the simulation system has been a cybernetic model of the functionary (broadly defined) who is to result. This does not mean that the description of the functionary has to be in terms of a rigid admini- strator of pre-set procedures. On the contrary, one of the most interesting potentials of simulation is for the training of problem- solvers. In fact, there has already been at least one experimental use of simulation in teacher training in which the goal was to increase the flexibility with which the teacher would perceive the learner and modulate his behavior during interactive teaching.[1] However, it is very difficult to plan for the extensive use of simulation unless there is

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[1]Bruce R. Joyce, Peter Dirr, and David E. Hunt, "Sensitivity Training for Teachers: An Experiment." The Journal of Teacher Education, Vol. XX, No. 1 (Spring, 1969), pp. 75-83.

an effectively functioning model of the performer who is to emerge. Development of the simulation experiences specified in the program models will have to be accompanied by the creation of more complete and unified working models of the teacher (as indicated throughout Chapter Three). A little elaboration will illustrate the point. As specified in the present versions of the model, simulation can function to:

A. Introduce new areas of development. (The realistic, controlled confrontation of simulation helps the trainee become aware of the need to learn and clear about how the new learning will relate to his performance as a teacher.)

B. Provide for the operationalization of learnings in the form of teaching performance. (Learnings from other modes become integrated in performance.)

C. Provide for the integration of several domains of learning. (Simulation can present opportunity for the successive incorporation of new skills and other learnings into operational performance.)

D. Provide for a gradual increase in complexity so that the developing teacher can deepen and extend his skill.

E. Personalize the development of the clinical style. (ComField has significantly grasped the possibilities of simulations which leave much room for personal style while requiring precision of performance and accountability for results.)

If we consider only "C," the integration of learnings from several modes and domains, and "D," the staging of complexity, it is apparent that neither of these can be achieved without a cybernetic conception which relates growth in several domains and conceptualizes the possible stages of complexity.

Personalization of Learning

Aside from the considerable power which modular curriculum structures have for facilitating the individual pacing of learning through pre-set sequences of activities, a feature which is shared by all the program models to a considerable degree, to what extent do they personalize the education of the teacher, helping him develop his uniqueness and actualize a personal style of teaching?

The chart on page 132 gives our estimate of the relative power of each of the program models to personalize the teacher's education.

Pittsburgh, Syracuse, and ComField each employed devices which could be emplyed to increase the personalization of the other models.

Figure 4.3. Extent of Potential Personalization of the
Models for Elementary Teacher Education

<—————— Maximizes   Minimizes ——————>
         Personalization   Personalization

Pittsburgh
    Syracuse
        ComField
            Michigan State
                Florida State
                    Toledo
                        Massachusetts
                            Georgia
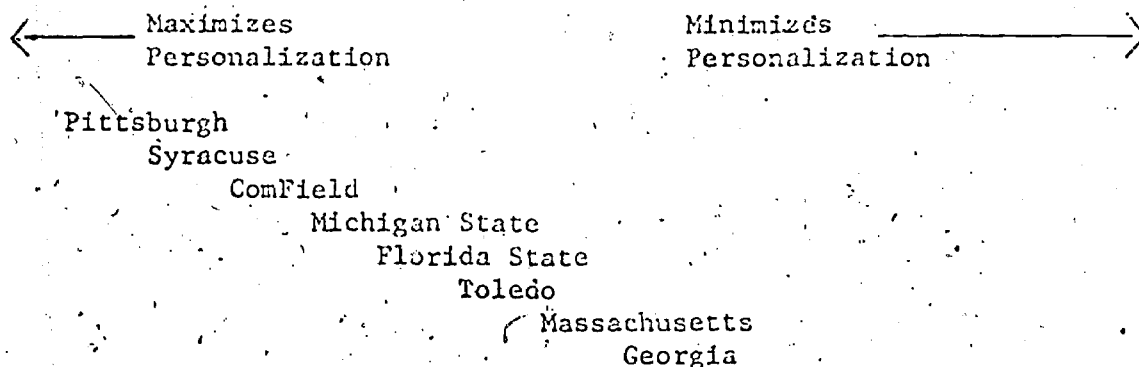
Pittsburgh arranged a faculty-student relationship which provides
for regular program-planning for each student with continual re-setting
of goals and development of means suited to the personal style of the
teacher-candidate. While the mechanics of this are not by any means
fully worked out, it seems feasible to develop a counseling system
which could provide, in any model, for counseling relationships within
which faculty could modify experiences to suit the candidate or help
the candidate plan and carry out individual learning activities within
the resources of the program.

Syracuse employed two primary devices. One was the general con-
ception of the teacher as a problem-resolver, a person who would use
general professional knowledge and skills to solve problems but who
would have the personal capacity to generate ways of approaching
problems. Thus individualized and personalized experiences alternate
through the program.[1]

Second, Syracuse provides for a "self-directed component" which
they describe as follows:

Self-Directed Component. This component is intended to foster
independent, self-directed activity oriented ultimately toward
professional ends. It has considerably less structure than
the preceding components particularly with respect to the
subject matter which will make up the component. It does
have the structure provided by specific goals and the sup-
porting instructional situations which characterize the com-
ponent. The essential task for the student in this compo-
nent is to (a) determine what changes he would like to see
take place in the children he teaches, (b) describe these
changes behaviorally, (c) determine what specialized train-
ing is needed (in addition to that provided in other com-
ponents of the model program) to help him in the accomplish-
ment of these goals, and (d) to accomplish such ends as
he has specified with the pupils he teachers during his
resident year.

The component provides a firm helping relationship.
in the performance of this complex task. The student
selects a counseling-advisor with whom he works on a reg-
ular basis. This relationship between student and coun-
selor-advisor is an enabling relationship combining the
talents of the counselor with the talents of a generalist
in the field of elementary education. In addition to this
one-to-one relationship with a counselor-advisor, the
student may participate in one of the student-controlled
enabling seminars of about twelve students each. These
activities are to be supplemented by a student-controlled
weekly newsletter for expressing ideas and concerns about
the profession and the program.

The student develops a "planning and goals" paper
around which his self-directed activities evolve. He is
ultimately expected to realize these plans and goals
through his own independent activities. The goals toward
which this component work are the goals of professional
independence which will enhance the dignity, integrity, and
autonomy of the student as a teacher, help him take respon-
sibility for his own learning, and help him to independent-
ly modify his own ideas, values, and behavior. From this
self-directed activity would come (a) continued increased
understanding of the unique qualities of self as a teacher,
(b) the development and implementation of a personalized
set of educative experiences culminating in a professional
specialization that transcends the general training gained
in the basic program.[1]

ComField makes effective use of a teaching laboratory which
utilizes many simulated teaching tasks and encourages the development
of a personal teaching style as well as the mastery of prescribed
professional knowledge and skills. The simulation laboratory has con-
siderable potential in this direction.

Individual Program Strategies

The programs are so massive that to characterize each of them
adequately in a report of reasonable length and clear enough structure
is out of the question unless one severly limits the perspective he
uses. The perspective we have chosen attempts to identify the unique-
ness of each model approach and to ask the question: "How can this
model be improved so that its unique strength is enhanced?"

This question appeared to us to be of vital importance to the
developers of the models, since the basic question for the developer
and implementer of a model is, "Aside from the systems approach, with
the emphasis on performance goals, a modular curriculum structure, and
management oriented toward individualization and quality control,

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[1]Syracuse University, Ibid., p. 25.

features shared by all the programs, what is the unique strength of
each model and how can that quality be capitalized on?"

Hence, in this section we attempt to identify the most prominent
and potentially unifying element of each program model and recommend
procedures which are likely to increase the feasibility of the model
by capitalizing on its essential strength. Many of the recommendations
for each model are borrowings from other models.

Taking the Models on Their Own Terms

To make a fetish of internal consistency is an ugly form of
pedantry. If we avoid fetish, however, there are some striking
advantages to educational programs that have a high degree of inter-
nal consistency, for reasons that are much more than the brandishing
of theoretical elegance. An educational program that stands for
something both in terms of mission and means can have a unified power
and clarity which greatly increases its value.

In this section, we attempt to characterize the essential "model
for the model" of each of the projects and discuss the extent to
which the program which is specified accords with that model and
what would need to be done to bring the program more fully in line
with what seems to be the fundamental conceptions that give it its
greatest strength. For those who would further develop and implement
these models we feel that this may be the most valuable enterprise that
they can engage in. All of the other criteria by which we look at the
feasibility of the models and most of the criteria by which the them-
selves looked at feasibility during their Phase Two activity are exter-
nal to the structure of the individual models. There is validity in
the use of these external criteria and nearly each one of the models
can benefit by applying them during the feasibility-making stages,
but to give a program maximum strength and integrity it should be
developed so that the "model of its own model" has full expression in
the program that finally comes into existence.

Florida State University

The Florida Model is philsophically built on a concern for a teacher
of ten years from now.

The rationale for this model program is based upon:

1. predictions of what society and education will be
   like by 1978;

2. inferences about the nature of teaching and the role
   of the elementary school teacher by 1978; and

3. implications for the preparation of elementary school
   teachers.[1]

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[1]Florida State University, A Model for the Preparation of Elementary
School Teachers (OE-58018) Washington D.C.: USOE, 1968. p. 3.

They thus begin with a rather sound idea that if we plan a teacher education program today, its graduates will be at about the five-year point in experience about ten years from now, and, at a minimum we need to plan so that their preparation will be suitable for the world in which they then find themselves. Florida spent considerable effort in speculating about the future and the kind of person who would be able to operate effectively in the schools of the future. We feel that this is the essence of their model--an attempt to use systems planning to forecast the future and that systems procedures to develop training modes which would be appropriate for the future.

There are certain ways in which Florida fulfills its intricate model very well. One of these ways is by using a variety of modes of instruction, thus ensuring that the teacher in his own training will encounter many technologies and experience many strategies for learning and teaching, thus learning at first hand how they can be orchestrated in a fully contemporary way (see Figure 4.4, page 136). Since all of these modes emphasize self-paced experiences and criterion-referenced performance evaluation and all the activities are monitored by a computerized management control system with feedback capability, there is a definite future orientation to the texture of the Florida Model.

However, when we look at the substance of the modules themselves, to the kinds of teaching skills which will be taught and the kinds of knowledge which will be taught to the teacher, the picture is not so future oriented. It is, in fact, not very different from what has been the content of teacher training programs for at least the last forty years, with some updating of content. The conception of the teacher, in other words, does not seem to be as future oriented as does the conception of the need to prepare him in such a way that he will have a future orientation. Furthermore, there is very little provision for the development of reflective or creative thinking in the Florida Model. A teacher who would be comfortable in the fast-emerging future society which is depicted in the early sections of the Florida document would surely need to be philosophically prepared to reflect on what was happening to him, to gain some historical and philosophical perspective on the events that surrounded him. Further, he should be prepared to help others behave rationally while living in the midst of such rapid and unpredictable change.

We believe the Florida Model would take on greater strength if, as it is redeveloped for implementation, the view of the teacher is reconceptualized in a more forward-looking way. That conceptualization should, in our opinion, conceive of him as a philosophical person using his technology and building on it a new technology, but with the reflective- and creative-thinking capability to master the changing futuristic environment in which Florida believes he will find himself.

The ComField Model

The essence of the ComField Model lies in the conception of the teacher as an instructional manager who is able to bring about learning in children. In its program methodology we can see the desire to help

Individual Activities

Cmp   Computer Interaction

Int   Interview and Consultation

IS   Independent Study

LAV   Laboratory and Audio-Visual

Wr   Writing

Group Activities

Dsc   Discussion Group

Lct   Lecture

Prj.   Project

Prs   Presentation

Field Observation

Ocl   Observation in Class

OO   Observation in Other Site

Simulation

SmO   Observing Simulated Situations

SmP   Producing Simulation

Teaching

Tcl   Classroom

Tsg   Small Group

Tt   Tutorial (one student)

Figure 4.4. Experience Codes

The Florida State University, A Model for the Preparation of Elementary School Teachers, (OE-58018) Washington D.C.: USOE, 1968, p. 55.

the teacher develop a personalized style for managing instruction and
for providing the management-support service necessary to instruction.
The use of the laboratory for training is very much in line with their
view of a teacher and how he should be trained, for it provides many
opportunities to develop both a personal style and technical proficiency.
In other words, the use of the laboratory provides the setting in
which the teacher can be trained and evaluated in a way consonant with
their image of the teacher.

However, there are several unresolved questions within the Com-
Field structure which, if they were resolved, would greatly increase
the potential power of the model. First, they stress throughout that
the teacher candidate will be able to negotiate many of the activities
that he will pursue as he tries to prepare himself, yet the objectives
of the teacher education program are derived from the specification
of the kinds of objectives that might be set for elementary school
students and the kinds of conditions that would be likely to achieve
those objectives. The teacher presumably will be trained to produce
those conditions and to evaluate the outcomes. This means that many
of the objectives and activities will be specified for the teacher.
It is not explained how a system external to the teacher candidate
would be reconciled with the intent to have the teacher largely deter-
mine the nature and course of his own experiences. There is recogni-
tion within the report that some objectives are required of all teach-
ers and some simply of those who are going to be specialists or work
with specific kinds of children, but this acknowledgement does not
resolve the basic question, which is how within a systems design,
does one allow for student negotiation. There are a number of poten-
tial solutions to this problem. The ComField Model developers might
look at the kinds of devices generated at Syracuse to approach a
similar problem. For example, in the final report on the ComField
Model, we find the definition of teaching style as well as the spec-
ifications for the personalization of the process of teacher educa-
tion:

Teaching Style

As used in ComField, the concept of teaching style
refers to the matter of integrating and synthesizing the
various professional competencies develop through Com-
Field into a unique and personally relevant approach to
teaching. It is hypothesized that two factors are neces-
sary to bring this about: (1) a knowledge of alternative
styles, and (2) an opportunity to practice alternative
styles.

Specifications

1. Each student shall be exposed to alternative
   teaching styles through models.

2. Each student shall explicate his own teaching
   style.

3. Each student is to provide a rationale in support
   of his preferred teaching style.

4. Each student will have a series of nonevaluative
   interview within which to explore the meaning of
   behavior observed in the laboratory and practi-
   cum for the learner's definition of teaching style.

Specifications for the Personalization Process

There are no specific, independent learning experiences
within the ComField instructional program designed to bring
the personalization of professional competencies about. Per-
sonalization experiences are always a part of an instruction-
al system designed to produce a given competency and will
take whatever form that is required to permit the explora-
tion of personal relevance or meaning within that system.
(See Figure 4.5, page 139.) Almost always it will involve
contact with another person, however, either a peer or a
member of the staff; and it will almost always focus upon
the affective dimension of that which is being learned.
Since there are no specific provisions for the process and
since it has been described in some detail as it links to
the development of professional competencies only the basic
features of the process will be described. These may be
considered as specifications.

1. Instructional activities designed to increase
   students' awareness of their personal qualities
   and the implications of these for teaching style
   are to be included as an integral part of the
   program.

2. Assessment of all cognitive outcomes is accompa-
   nied by an assessment of the commitment held to-
   ward them.

3. Assessment of student performance is accompanied
   by an assessment of the congruence between behav-
   ior and that basic personality characteristic of
   the student.

4. Performance below criterion level leads to assess-
   ment of the basis for the failure and consequent
   remediation. Dismissal is more nearly based on an
   apparent lack of potential to perform the task
   rather than a punitive or arbitrary measure.[1]

The last statement in the description of the personalization pro-
cess at the top of page 104 says "performance below criterion level
leads to assessment of the basis for the failure and consequent re-

[1]Northwest Regional Educational Laboratory, _A Competency Based, Field
Centered, Systems Approach to Elementary Teacher Education_ (OE-58020)
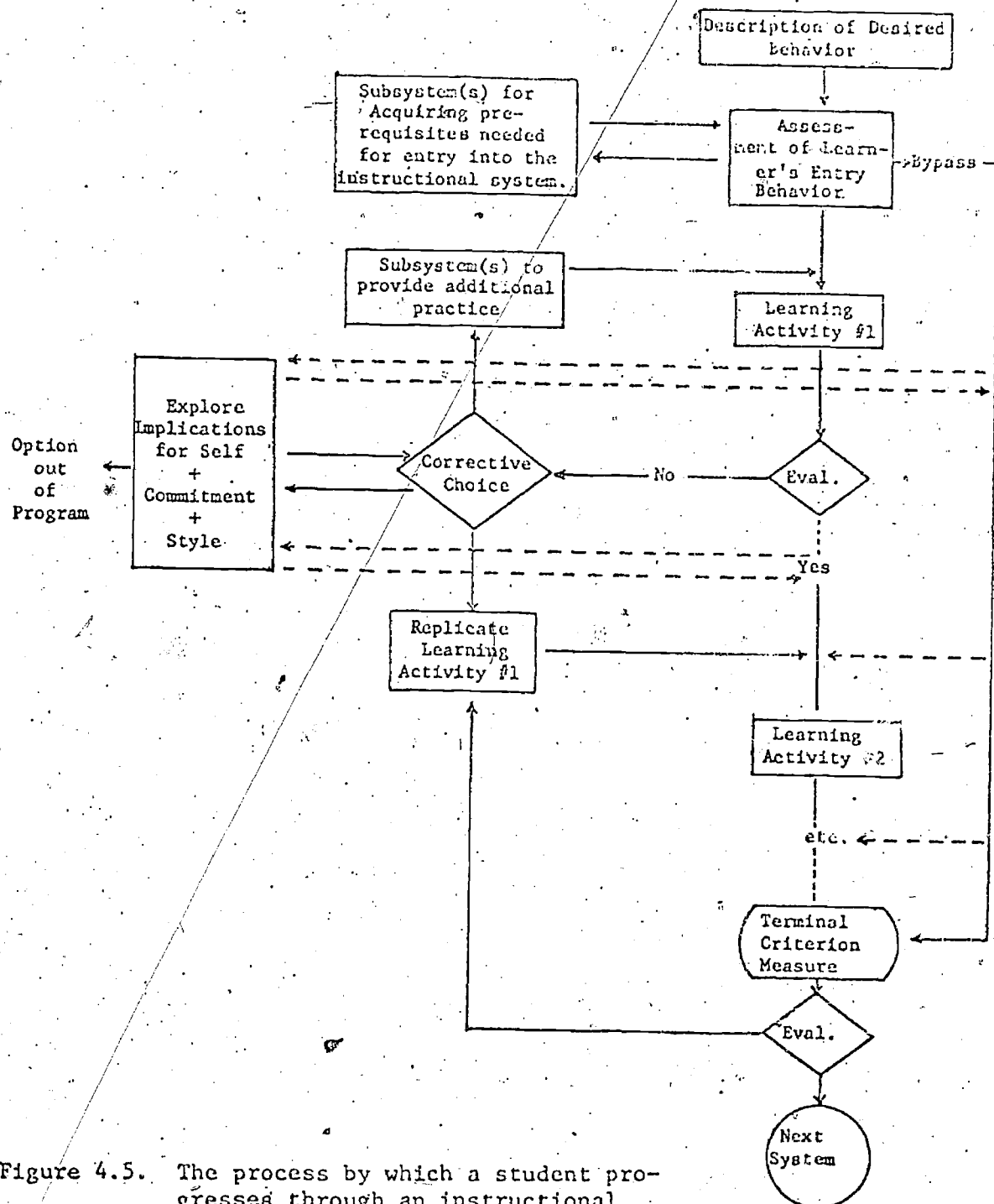Washington D.C.: USOE, 1968, Volume I, pp. 102-103f.

Figure 4.5. The process by which a student pro-
gresses through an instructional
system that is designed to bring
both the mastery and personaliza-
tion of professional competencies.

mediation. Dismissal is more nearly based on apparent lack of poten-
tial to perform the task rather than a punitive or arbitrary measure.'"
Evidently then, within the specifications for personalization we have
provisions for "deselecting" students who do not meet previously
specified performance criteria. This is a strange kind of personali-
zation.

The Syracuse personalization component, from which we think the
ComField developers could borrow profitably, while it is very loose
and somewhat unspecific in many places, is one way of providing for
the reconciliation between the personal needs, interests and aptitudes
of the student and the relatively rigid character of a modular systems
model which is accompanied by quality control procedures.

The Teachers' College system of organizaing students into inquiry
groups which administer most of the teacher education program to them-
selves with the assistance of faculty counselors also provides a great
deal of room for the kind of personalization that ComField says it
wants but does not seem actually to provide, because it permits students
to redefine goals and means while they move through the program.
Quality control is vastly complicated by such a procedure.

The Michigan State storage-and-retrieval system for modules also
provides a matrix in which personalization might be achievable. By
making all faculty and students aware of what modules reside in the
information-storage-and-retrieval system the personalization of a pro-
gram becomes much easier, for the structure of the program becomes
transparent and can be matched much more closely to the style of the
individual. Without such a matrix and a guidance component to help
the student retrieve and learn the modules that are most appropriate
to his needs, the flexibility of the system model with respect to
individuals would remain more apparent than real.

The University of Massachusetts Model

The Massachusetts Model emphasizes in philosophy the need for the
individualized perparation of the teacher and an intermingling of
human relations skills, teaching skills, and content knowledge. How-
ever, these are described so separately that the Massachusetts Model
does not seem to have an essential point of view which unifies it or
which represents its character or the character it would be likely to
take on during development. As is pointed out in another place, a
suprisingly large number of the Massachusetts modules do not have
objectives which reach our criteria for behaviorality and, thus, they
could not be implemented as they presently stand without tremendously
greater specification. Furthermore, within many of the important com-
ponents such as the teaching skills or the "behavioral" component, the
skills often seem trivial compared with the rather strong statements
of needed teaching strategies which characterize some of the other pro-
grams such as Pittsburgh, Syracuse, Michigan State, and the ComField
Model. The objective of one module, for example, is "to get the teach-
er to ask as many questions as possible during the lesson, so that a

beginning teacher's dependency on the lecture method can be overcome."[1]
This objective is disturbingly chaotic. Furthermore, to ask a teacher
to "ask as many questions as possible" seems irrational--does he do this
regardless of what the children do? Also, does the instructional alter-
native (four micro-teaching sessions) have any real chance of reducing
someone's dependence on the lecture? In other words, we had a good
deal of difficulty determining the essential character of the Massachu-
setts Model.

Moreover, the program is almost completely without a philosophy,
although it does deal with the affective development of the teacher to
a laudable extent. Dealing with emotions without a philosophy can
become unnerving at times. A module, for example, has as its objec-
tive within the area of race relations "the ability to recognize and
deal with fear and sexual attitudes."[2] The instructional alternatives
are as follows:

The trainee will participate in a fantasy storming
session about fear of physical attacks by blacks. Sessions--
all white--will be hour-long and run for six times.

The trainee will participate in an all-black fan-
tasy storming session about fears and hatreds of whites.
Six sessions, one hour long.

The trainee will participate in a fantasy storming
session about fear of physical attacks and sexual abuse.[3]

The team that examined this model is agreed that the ability to
recognize and deal with fear and sexual attitudes in a racial context
is very unlikely to be changed very much by six hours of fantasy storm-
ing sessions, and it seems almost a Kafkaesque world that would suggest
that such might be true. Certainly fantasy storming sessions might
open up such attitudes so that people could articulate them, and that
might be the beginning of symbolic control, but if one really has fear,
sexual fears particularly, that are racially linked, there will be no
short-term course of therapy, even intensive therapy, that will change
those fears; to pretend so is ridiculous. The Massachusetts Model is
full of such absurdities. On one level they sound attractive because
the Massachusetts Model certainly does deal with racial issues, ethnic
issues, and one's personal need to develop a fully functioning self in
a world which is laced with racial, ethnic, and economic class conflicts.
However, when one looks at the specifications and finds out that a
modular curriculum has been presented in which relatively short instruc-

[1]University of Massachusetts, Model Elementary Teacher Education Pro-
gram (OE-58022) Washington D.C.: USOE, 1968, p. 264.

[2]Ibid., p. 258.

[3]Ibid.

tional systems are supposed to be effective in those areas, one has to questions the sincerity of the entire model.

The whole section on sexual awareness in the Massachusetts program is similarly suspect. For example, let us look at sections from the final report of the project, pages 252-256.

In this entire section, the Massachusetts Model, quite laudably in our view, gets into areas which are extremely important in the functioning of the individual, both personally and as a teacher, and the designers of the Massachusetts Model do not shrink from a substantive involvement with sex or anything else that they think is important to the development of the individual.

However, their performance criteria are highly unspecific and their activities are not clearly related to the objectives. In areas as critical as sex, this seems to us to be a fatal blow to the feasibility of the program as it stands. The more critical and personal the areas, it seems to us, the more we must strive to be very specific in the description of objectives and activities, and the clearer we must be about the potential relationships among them. Evaluation in areas as critical and personal as these becomes a matter of the protection of the student as well as the assessment of him.

In addition, much of the material in those areas seems to be very loosely constructed. For example, in terms of the physical awareness of sexuality, the instructional alternatives are:

> The teacher trainee will participage in an Esalen-type seminar or series of seminars which centers on the freeing of the body, and its sexuality.

> The teacher trainee will teach a ten-minute micro-teaching lesson on the discoveries he made in the above described seminar(s) noting especially the part of his understanding that is significantly nonverbal.[1]

There is really only one instructional alternative here and it occurs in two phases, one of which is quite extensive (the Esalen seminar) and the other of which is simply a ten-minute lesson. How these relate to each other is not specified nor are we told what is to be done with the ten-minute episode in order to help the person perceive what he has learned and develop some views of himself in relation to the important area in question. A more powerful philosophy in the Massachusetts Model, we believe, would have avoided superficiality and disconnectedness of this sort. If one really cares about his trainee, one simply does not put him in encounter groups and then assume that the objectives of those groups have been achieved. He may use encounter groups to open up personally important areas and then provide experiences to help the student incorporate

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[1]The University of Massachusetts, Ibid., p. 254.

those experiences into his overall pattern of functioning.

In short, to live up to its rhetoric, Massachusetts needs a philosophy. If it gets that, as well as a more unified model of the teacher during development, it could become a fascinating program.

The Michigan State Model

The BSTEP Model has as its essence the clinical behavioral style, and it conceives liberal and professional education as contributing in various ways to the development of that style and the individual variations it is likely to have.

The program is well unified around this conception of style, but a tremendous amount more could be done to unify the 2,700 relatively single-purpose modules into meaningful clusters, as is described on pages 126 and 127. In addition, the modules themselves are extremely uneven with respect to the specification of objectives, pre-requisities, and evaluation. The specification problem is easily rectified in a program which is developed over a longer period of time when there is time for a more adequate quality control than was possible in the eight months in which the original models had to be completed.

To make the essence of the model really powerful, however, the BSTEP developers have to face a very complex and delicate problem, one which, as they resolve it, should have a considerable yield for the improvement of systems design procedures. That is, the extreme disjunction between the program and the clinical style that the teacher trainee is himself supposed to manifest when he has completed the program. A student, in other words, does not live the model he is expected to become, but he lives in a very specific modular structure which is supposed by small increments to bring about the general kind of behavior he is to manifest later. The style of the program does not fit the behavioral style which the trainee is to adopt later.

The solution to this problem should probably be unique to the BSTEP Model, but developers can borrow ideas from some of the other models as they search for their solution. Especially, they might borrow from the Pittsburgh Model, whose program has almost an exact congruence with the type of teacher who is to be produced. It seems to us that it would be possible for the BSTEP developers to create a way in which their program could be administered to the students with the same clinical style that is specified for them. For example, a counselor could propose to and with the student what he should do next, then the student could operate as a self-teacher, or in taking seminars or lectures which are led by others, he could share the purposes of the teacher. He could then further propose, do and reflect once again. In other words, it is not the modular structure of the program which conflicts with the essential model of the program. It is that the modules were not constructed in an organizational matrix that permits the clinical behavior style to be as much a part of the teacher education program as it is later hoped it will be a part of the behavior of the teacher. This, we feel, is a

Figure 4.6. Selected Modules from the Michigan State Model. 144

*OBJECTIVES   1, TO DEVISE SUBJECTS, SEQUENCE AND TASKS IN CONCERT WITH 02481 27
               STUDENT IN ORDER TO FULFILL A STATED OBJECTIVE, TO DESIGN 02481 28
               LEARNING ACTIVITIES WITH PUPILS, 2, TO ANTICIPATE OPTIMAL 02481 29
               GROUP INTERACTION AND DECISION-MAKING THROUGH CLASS   02481 30
               GROUPING AND LOCATION,   02481 31
*EXPERIENCE   1, THE TRAINEE WILL, IN WRITING: A, STRUCTURE A   02481 11
               HYPOTHETICAL INSTRUCTIONAL SITUATION BY SPECIFYING   02481 12
               LEARNER CHARACTERISTICS ≥E,G, AGE, ABILITY, BACKGROUND,   02481 13
               ETC,*, CONTENT AREA ≥E,G, THE COMMUNITY, CREATIVE WRITING,   02481 14
               ETC,*, OBJECTIVES AND ENVIRONMENT, B, ESTABLISH AN   02481 15
               APPROPRIATE CLASSROOM ARRANGEMENT AND GROUPING WHICH   02484 16
               WOULD OPTIMIZE GROUP INTERACTION AND DECISION MAKING,   02481 17
               2, IN AN A-V LABORATORY HE WILL THEN AUDIO TAPE RECORD HIS   02481 18
               INSTRUCTIONS AND SYNTHESIZING ACTIVITIES WITH THE   02481 19
               HYPOTHETICAL CLASS, THE INTENDED RESULT IS A GROUP PLAN   02481 20
               FOR SUBJECT, SEQUENCE AND TASKS TO ACHIEVE THE STATED   02481 21
               OBJECTIVES, THE TRAINEE IS FREE TO REPEAT THE ACTIVITY   02481 22
               UNTIL HE IS SATISFIED WITH THE PRODUCT, 3, AFTER   02481 23
               SUBMITTING THE WRITTEN STATEMENT AND TAPE, HE WILL RECEIVE   02481 24
               FEEDBACK FROM THE INSTRUCTOR REGARDING THE IMPROVEMENT OF   02481 25
               THIS PRACTICE TEACHING EXPERIENCE,   02481 26
*SETTING   INDEPENDENT   02481 10
*MATERIALS   TAPE RECORDING EQUIPMENT IN AUDIO-VISUAL LABORATORY,   02481 5
               TAPES FOR STUDENT USAGE,   02481
*HOURS   1   02481 6
*GENERAL   ALL CANDIDATES   02481 7
*LEVEL   ALL GRADES   02481 8
*FILE   GROUP PLANNING   SELECTING SUBJECT MATTER   02481 9

*OBJECTIVES   TO DEMONSTRATE ABILITY TO MAINTAIN EFFICIENT AND EFFECTIVE   02675 15
               WAYS OF COMMUNICATING WITH AND CONTROLLING CHILDREN.   02675 16
*PREREQUISITE NONE   02675 17
EXPERIENCE   TEACHER CANDIDATE WILL OBSERVE CLASSROOM TEACHER ≥S USING   02675 11
               VARIOUS TECHNIQUES FOR MAINTAINING ORDER, GAINING   02675 12
               ATTENTION, AND CONTROLLING NOISE LEVEL AND WORK HABITS OF   02675 13
               THE CLASS ≥READ OR SIMULATED*.   02675 14
SETTING   SMALL GROUP ≥1-12 STUDENTS SCHOOL   02675 10
*MATERIALS   BLANK   02675 5
*LEVEL   ALL GRADES   02675 8
*GENERAL   ALL CANDIDATES   02675 7
*HOURS   1/2 TO 3/4   02675 6
*EVALUATION   STUDENT IS ABLE TO DEMONSTRATE THE USE OF VARIOUS SIGNALS   02675 18
               AND TECHNIQUES TO CARRY OUT DAILY CLASSROOM FUNCTIONS   02675 19
               EFFICIENTLY AND FREE FROM INTERRUPTIONS,   02675 20
*FILE   FIELD DISCIPLINE PRACTICUM   02675 9

*OBJECTIVES   TO IDENTIFY DANTE*S ATTITUDES CONCERNING MAN≥S PROPER   00722013
               RELATIONSHIP WITH NATURE, TO COMPARE AND CONTRAST THOSE   00722014
               ATTITUDES WITH SOPHOCLES* AND JOB*S ATTITUDES AND WITH   00722015
               ANALYZE THE REASONS FOR THAT RELEVANCE   00725016
*PREREQUISITE PREVIOUS MODULES   00722017
*EXPERIENCE   DISCUSS DANTE*S ATTITUDES CONCERNING THE PROPER   00722011
               RELATIONSHIPS BETWEEN MAN AND NATURE,   00722012
*SETTING   SMALL GROUP (1-12 STUDENTS), COLLEGE   00722010
*MATERIALS   BLANK   00722005
*LEVEL   ALL GRADES   00722008
*GENERAL   ALL CANDIDATES   00722007
*HOURS   1   00722006
*EVALUATION   IN SMALL GROUP DISCUSSION THE INSTRUCTOR WILL EVALUATE THE   00722016
               STUDENTS≥ ABILITY TO IDENTIFY DANTE*S ATTITUDES, TO   00722019
               COMPARE AND CONTRAST THESE ATTITUDES WITH PREVIOUS   00722020
               READINGS (ON THE HEBREWS AND THE GREEKS) AND WITH THE   00722021
               ATTITUDES OF THE CONTEMPORARY WORLD,   00722022
*FILE   MEDIEVAL EUROPE DANTE MAN VS NATURE   00722009

relatively easy problem to solve, at least conceptually, but an important, even necessary, one for the BSTEP developers if their program is to realize the considerable potential it has.

The Syracuse Model

The essence of the Syracuse Model is the intent-action-feedback transaction which is to characterize the life of teachers and students within the model. In the professional sensitivity component, together with the use of decision points and the system for bringing modules together and relating them to each other, the overall design of the Syracuse Model is quite compatible with its essential model and is quite strong in its presentation to the student in that it lives up to what it says it does in terms of the intent-action-feedback model. It is our impression, however, that the model still leaves the student awfully alone in an enormous sea of components and that some of the devices which reside in some of the other models might be used to overcome this at least partially. Especially, it appears that some kind of counselor-advisee group could be formed that could help students relate to each other over their general progress and stimulate one another to get ideas for the many modules in which students can substitute activities for those which are suggested in the model specifications. Such a group would help provide a form for informal feedback that could make the program stronger and a social context for decision-making that could provide the student with solidarity as he works his way through the labyrinthine program.

Although, as usual, we are reluctant to suggest any of our local medicine for someone else's problems, the inquiry groups from the Teachers College Model might well be used within the context of the Syracuse Model to provide some of the psycho-social glue that appears to be lacking and a context in which students can become committed, through the formation of a reference group, to the kinds of ideals which lie at the social and philosophical core of the Syracuse program.

The University of Georgia Model: GEM

We see the University of Georgia Model as the "job analysis model" because it is a prototype example of one kind of systems planning—the kind which begins with the specification of a job description, makes a detailed analysis of that job, and then systematically plans experiences which are likely to add up to that job competency. The components of the model are, in turn, developed directly from the task analysis. The almost complete absence of any learning theory except behavior modification and the absence of program or module strategies which are based on other theories of learning contribute to the impression of the Georgia Model as a classic of the systems stereotype described by Jacques Ellul.[1]

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[1]Jacques Ellul, The Technological Society, New York: Alfred A. Knopf, 1964.

Taking the model on its own terms and not trying to impose other criteria on it, the model has to be judged in terms of the adequacy of the task analysis and the job description. Both of these tasks were carried out in enormous detail. Each of them have flaws which almost characterize the model and which we believe point the way to substantial improvements in the model. First, the task analysis is made, not from an actual job description of a teacher developed from a study of a teacher in action, but from a hypothetical model of a teacher developed by individuals considered to be experts in teacher training. The model was developed entirely at the behavioral level, that is, in terms of sets of behavioral objectives rather than a unified overarching conception of the teacher from which behavioral objectives could be described through a job analysis.

In other words, instead of describing a certain kind of teacher and then breaking that down into specific functions, they described a general functionary called an elementary school teacher and described him in terms of specific behaviors which became the objectives of the Georgia program. In the course of the development and implementation of the model, we believe it would be greatly strengthened if this position were reevaluated and if an overarching conception of the teacher could be developed. There are numerous examples of what this conception might be like in the various models. The Michigan State conception of clinical behavior style, the ComField conception of a person with the competency necessary to bring about certain kinds of learning, the University of Pittsburgh conceptualization of the teacher as an individualizer and the Teachers College conceptualization of the teacher as an innovator--all should be heuristic examples from which the Georgia developers could draw in strengthening their specific model.

Similarly, they describe the elementary school child in terms of specific behaviors rather than in terms of an overarching description from which the specific behaviors could be derived. They did not conceptualize him, in other words, to be a creative thinker or an intellectual or a social activist or a productive citizen or in any of the other ways a student might be conceptualized. They proceeded directly to describe the desired behaviors of the child in rather specific terms; again without an overall philosophical conception under which to describe the behaviors which could be developed. As a result, many of the behaviors within the program seem to have an ad hoc character and seem to be unrelated to one another.

The Georgia development plan calls for the development of a performance module for each of the more than 2,500 objectives of the program. Such a large number with no overall unifying conception leads to a program of extremely "atomic" character, as discussed in an earlier section of the chapter.

Management Systems

The massive modular programs which will result when the models are developed and implemented depend for their feasibility on extremely

efficient management-systems which can store modules, coordinate support services, relate program elements to individuals, store assessment data, and be used for resource management and program improvement. In the feasibility studies, management technology was uniformly employed to estimate costs, generate developmelnt schedules, and plan the management of implementation.

Individualized, performance-based education for large numbers of students in any area cannot be conceived unless contemporary management systems are employed. In addition, program revision depends on continual assessment with redevelopment of poor program elements and smooth integration of the fresh components into the ongoing program.

All the models assume this and they have specified very similar management systems or implied them by other specifications. The requirements of the systems are exemplified by the Florida State proposal:

Overview

The computerized management control system (CMCS) can best be conceptualized in terms of the needs of the various users of the system. One type of user will be the trainee and the professorial staff who are assisting the trainee. Their primary interest will be in determining the "location" of the teacher candidate in the training program, what behaviors should be learned next, etc. The system should provide these users with information for counseling the trainee in terms of the instructional alternatives which are available to him. It will also serve as a record of his past performance. (The exact nature of the trainee's record will be described later.)

A second type of potential user of the CMCS is the administrative force which will be required to implement the training program. Their primary problem will be one of allocation of human and material resources. Certain program activities will require the availability of rooms with videotape recorders; others will require small rooms which can be used for group discussions. At certain times faculty members will be required to be on campus, while at other times, they will be needed as observers in the schools and in-service centers. In order to anticipate these needs and prepare for them, the administrators must be fully aware of the resources which are required for implementing the program, and must be able to determine the rate at which trainees will require access to various facilities and resources.

The third type of system user is the curriculum developer and the researcher, the people who are responsible for producing the instructional materials and experiences and for monitoring the success of each of these. It may be

anticipated that this group will be composed of a large number of specialists in such areas as content, audio-visual devices, professional writing, curriculum, and educational research. Their interests will not be limited to a single trainee's total score on a criterion test, but rather on the performance of a large number of students on each of the subcomponents within a task. In addition, they will want to determine the relationship between the trainee's present performance and his past and future performances. This information will be used to revise the various activities and materials, and to determine the feasibility of various instructional sequences.

Two-System Concept

The analysis of the potential users of the CMCS indicates that some of the users, namely the teacher candidates and professional staff, will need to have access to the information which is in the system on an as-needed basis. This suggests that the CMCS should operate in real-time, i.e., the trainee or faculty member would be able to have access to the information via a remote terminal at any time during the day. The information in the system, in turn, should be accurate and up-to-date. On the other hand, the program administrators and curriculum developers have more lead time in terms of their requests for information. For example, the administrators could receive a weekly or semi-weekly status report on all students and an indication of anticipated resource needs. The curriculum developers would work with researchers in planning exactly what data they would like to retrieve from the system in order to evaluate their own materials and activities.

This further analysis of the users and their demands upon the system indicates that not only will they have various lags in terms of the time required to receive information, but they will also be seeking different types of information. The trainee and professor will want information about the events related to a single trainee; the administrator will want information on single events.

Therefore, it is proposed that two interrelated systems be developed. The first system will serve the trainee, the professor and the administrator; it will operate in real-time, via remote terminal access for the first two users, and will operate in batch mode for the administrator. The second system will operate only in batch-mode and will be entirely oriented toward the needs of the curriculum developer. These two systems will be further explicated in terms of systems concepts, input and output procedures, and hardware and software requirements.

The real-time management system will utilize the manage-
ment tool called Program Evaluation and Review Technique
(PERT) for the control of a trainee's program. A review of
the management requirements of the program and the management
assets of PERT for appropriateness of fit might be desirable....

Real-Time Management System

The best way in which to conceptualize the real-time
management system is to consider a very large PERT network.
The entire network represents the total training program for
one trainee....The full implication of the use of the network
can be shown through a discussion of the five basic types of
information which will be included in the system:

1. trainee background information;

2. sequential list of criterion behaviors or events;

3. PERT network and trainee progress records;

4. list of activities available for achieving each event;
   and

5. estimated times to achieve each objective.

Trainee Background Information. For each teacher candi-
date, there will be a short record of his skills, interests,
and aptitudes as he enters the program. The information in
this record will include that information which is most often
used in counseling trainees: high school and university grade
point averages, various aptitude scores, relevant experiences,
and interests.

Sequential List of Criterion Behaviors or Events. A list
of numbered events will be inserted in the system so that in
addition to indicating that the trainee has mastered event
057, a printout can show that he has demonstrated the ability
to use probing techniques.

PERT Network and Trainee Progress Records. A numbered
pathway for each student will be established. As a student
completes an event the following 20-digit record will be
inserted:

1. trainee identification number (3 digits);

2. event identification number (3 digits);

3. number of times the trainee has repeated the event
   (1 digit);

4. minimum score acceptable on the event (3 digits);

5. score achieved by the trainee on the event (3 digits);

6. date that criterion instrument was attempted (6 digits); and

7. indication that a comment is associated with the trainee's performance (1 digit).

For instance, a sample trainee record such as 057 547 2 078 085 020668 1, could be interpreted as follows:

This is a record for trainee 057's performance on objective 547. The student took the criterion test two times. The minimum acceptable score on the criterion is 078; the teacher candidate has a score (on his second try) of 085. The evaluation took place on February 6, 1968, and a comment has been recorded relative to the trainee's performance.

If the trainee is required to repeat an event, the most up-to-date record will be available on the system; previous records will be stored and made available as needed. Item seven, above, will consist of a "1" if the professor or trainee wishes to make a comment about this event. Otherwise it will be a "0". A list of these comments will be generated with their associated trainee and event numbers, and will be available as needed.

List of Activities Available for Achieving Each Event. This list will be available for each event. It will indicate what materials and activities may be used for achieving each objective. At the initial stage in the development of the entire program, the only means for achieving a particular event might be by taking a particular course. As the program expands and becomes truly individualized, a great number of alternatives may be available to the trainee. The advisor would assist the teacher candidate in his selection of the most appropriate alternative.

Estimated Time to Achieve Each Event. A critical element of all PERT networks is the estimate of time required to carry out each activity. There are usually three estimates: optimistic, pessimistic, and most likely. Initial estimates of these parameters will often be based on very little concrete data; however, after a number of teacher candidates pass through the new training program, time estimates of this type should become quite realistic and therefore should be included in the computerized management control system. Such information would be invaluable to the program administrator as well as the trainee and his advisor.

The five features described above characterize the real-
time management system. More details will be indicated in
the sections on input and output and systems requirements.
We now turn to the essential characteristics of the batch-
mode retrieval system.

Batch-Mode Information Retrieval System

This system will serve primarily curriculum developers
as well as educational researchers who will use these data
to explore a variety of training hypotheses. It will essen-
tially be a very large data base from which specific types
of information may be retrieved in order to be summarized
via standardized data analysis techniques. The basic infor-
mation in this system will be of two types: (1) trainee back-
ground information; and (2) detailed trainee performance
information.

Trainee Background Information. There will be a complete
file on every trainee which includes all the information
which is gathered as part of the selection procedure. This
information is described in detail in another part of this
document. In general, the file will include such informa-
tion as scores, attitudes toward children, self-image, and
openmindedness. It will also include information on the
trainee's progress during the first two years of college,
including such items as course performance, academic inter-
ests, and extra class interests.

Detailed Trainee Performance Information. This will be
a complete file of all the teacher candidates' performances
on all activities in the program. For activities which re-
quire the development of certain cognitive skills, the data
may be in the form of results of a multiple choice test.
If the activity relates to the learning and demonstrating
of a certain technical skill in teaching, the data may re-
present the results of an observational checklist.

The purpose of these data will be twofold. The cur-
riculum developer can retrieve that data which are relevant
to the activities which he has created. The data will be
invaluable in the formative evaluation and revision of the
instructional materials and activities. The curriculum
developer may wish to use the background information on the
trainees to stratify his data in various ways; e.g., per-
formance of junior college vs. home institution trainees.
The second purpose of the data will be to investigate the
relationships between background information and perfor-
mance in order to make the training appropriate to various
types of teacher candidates, to enhance the validity of the
selection procedures for the program, to predict success in
inservice activities, and to investigate alternative se-

quences for the instructional events. More details on this
information retrieval system appears in the sections on in-
put and output, and systems specifications.[1]

Although there were some differences, the Florida statement con-
tains the essential requirements for the computer assistance needed
to operate an intricate program and provide for its continuous regen-
eration through curriculum development. The provision for regenera-
tion may be the most radical departure from previous teacher education
programs, for the modular curriculum design permits replacement of
curriculum elements as new ones are developed. Continuous assessment
and redevelopment enables a rate and precision of curriculum improve-
ment not possible without computerized management, just as the student-
oriented aspect of management permits individualization and personali-
zation of a sort not previously conceivable.

Florida State was concerned in its feasibility study to test the
capability of its CAI system to monitor instruction and also sampled
the reaction of students to the management process and the modular
curriculum. The results were generally positive, leading toward more
extensive testing of more complex groups of curricular elements and
the ability of the management system to handle more complex demands.

The type of research conducted by Florida State and the subsequent
research to test the feasibility of the specified management systems
are essential to lay a basis of information on which development and
implementation can proceed, for there has been almost no real-world
experience with this type of management system in educational applica-
tion. The specified systems appear eminently logical, but there are
many important human considerations about which little is known.
Systems which are flexible enough in industrial application may not
be capable of adapting to human needs unless they are extensively
modified--or they may work without essential modification.

Research in this area is urgent simply because the entire modu-
lar approach depends so absolutely on an effectively functioning
management system. There is little point in speculating on the feasi-
bility of the management systems without direct tests.

The ComField short statement of specifications makes clear the
importance of the management aspect of the models:

<div style="text-align:center">

Specifications for the ComField
Management Model

</div>

Content Specifications

Content Specification 1. The management model shall
contain the support functions required to permit a

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[1]Florida State University, A Model for the Preparation of Elementary
School Teachers (OE-58018) Washington D.C.: USOE, 1968, pp. 135-143.

ComField based instructional program to operate.

In order to operate, the ComField Instructional Model
requires eight support functions:. 1) management of the
instructional process per se, that is, managing teaching-
learning interactions; 2) development of the instructional
systems for use in the program; 3) continuous evaluation of
the effectiveness and appropriateness of the program as a
whole; 4) continuous adaptation of the program in light of
its systematic appraisal; 5) program execution; 6) personnel
selection and training; 7) maintenance of equipment, supplies
and facilities; and 8) maintenance of the information manage-
ment system needed to permit all of the above to occur.

Content Specification 2. The management model shall
contain a supporting function designed to provide cost/
effectiveness data on all operations within a ComField
based program, as well as the program as a whole.

Two demands are placed upon such a function:

1) an accounting of the resource requirements (full
system costs) needed to operate and maintain Com-
Field; and

2) the provision of cost statements reflective of pro-
duct costs, effectiveness and impact.

Organizational Specification

Organizational Specification 1. The management model
shall be organized in such a way that all functions
within it will have as their aim the enhancement of
instruction.

Too frequently the founding purposes of programs are
lost sight of or are relegated to a position of secondary
importance as time passes and the demands of operation take
their toll. With so many functional/components needed in
its support a ComField based program is particularly sus-
ceptible to this threat; any of the support components
could readily become "an agency unto itself." The manage-
ment model...is the result of an effort to create an organ-
izational operational framework that protects against this
kind of danger. - Conceptually it:

(a) places the instructional program squarely in the
center of things,

(b) stresses the idea that information and directional
influence flows both from the instructional com-
ponent to the support units and vice versa, and

(c) provides for a continuous flow of information to
the policy-adaptive component and hence to the
program execution component.

While such a model cannot guarantee that all units within a
ComField based program will act in concert, it does provide
an operational framework which at least makes it possible.[1]

The critical factor in the success of such a system is the devel-
opment of an appropriate interface between user and system (as recog-
nized in the Florida Study) and the workability of the program elements
themselves. The conception of the teacher and its breakdown into ele-
ments around which components are built has to be skillfully done and
program elements have to be skillfully interrelated or the management
systems cannot function properly.

The conceptions of the management systems seem sound; if the pro-
grams are well-conceived, the management capacity as outlined in the
proposals is more than adequate to monitor development and implementa-
tion.

[1] Northwest Regional Educational Laboratory, A Competency Based, Field
Centered Systems Approach to Elementary Teacher Education (OE-58020)
Washington D.C.: USOE, 1968, pp. 34-35.

Chapter Six

The Model of the Teacher:

Is a Generalist a Set of Specialists?

The goal of a performance-based teacher education, whether
for initial training or at the in-service level, is expressed in
terms of a working model of the teacher.

In this chapter the argument is presented that the concept
of a teacher who will fill a complex role is a conception of a set
of specialists, whether one person or several engages in the specialized
types of teaching that are defined. This stance contrasts sharply
with the traditional one in teacher education--which is that teach ing
is a generalized activity of which specialization is a variation.

There is no such thing as a generalist in education.
Some people can simply do more specialized things than others.
But hardly anyone can do more than a few things well.

Traditionally teaching has been viewed as a generalized
capacity to relate to children, substantive content or skills,
and instructional materials. Teaching competence has been
viewed as an ability analogous to intelligence--it would
pervade a large range of activities which teachers might
perform.

The experience of innovative movements in education has
shown us that the conception of teaching as a general capacity
to educate is erroneous and disfunctional. Most teachers
simply have not effectively adopted the new roles or learned
the new strategies unless a massive inservice effort was
made.

However, if teaching is thought of as the ability to
provide a particular, specialized kind of educational service,
it becomes at once apparent that there are a multitude of
specialized services which make quite different demands on
the teacher. For example, helping children write creatively
is different from teaching biology inductively. Helping

children use instructional systems is different from
providing counseling for them. No doubt some teachers can,
without special training, move from role to role and strategy
to strategy. That a few can do this should not deceive us
into making the inference that all teachers can learn to do
it as a result of general or even special training.

It is far more productive to view teaching as a set of
role-competencies each of which has to be learned specifically.
From this stance a teacher becomes a person who can engage
in one or more types of teaching. If one can master enough
teaching strategies in enough domains, then he can become a
generalist—someone who does a lot of specialized things
well. It also may be true that persons who learn several
specialized roles can master new ones more easily, much as
the learning of one or two foreign languages decreases the
time and effort necessary to learn others. It also may turn
out to be possible to provide some generalized training
(perhaps in certain basic skills or knowledge) which will
greatly facilitate the learning of new roles and teaching
strategies.

What are the practical implications of this stance that
a generalist is a set of specialists?

First, it permits us to identify the roles we would
like the teacher to play and to train him specifically for them.

Second, it assumes that innovation requires the learning
of new knowledge and skills which have to be made explicit
and trained directly.

It prevents us from thinking that we can make a change
in education simply by getting some "good people" together
and pointing them in a new direction.

Third, as an extension of the first point, it enables
us to turn teacher education into a technically feasible,
activity because specialized teacher roles and strategies can
be identified and specialized training can be designed to
accomplish them.

Finally, it suggests that we determine teacher competence
not by indicators of general quality but by evidence that he
can do particular jobs. A teacher of high generalized
capacity would not be assumed to be competent for any teaching
role or situation.

How Can Specialized Roles Be Defined?

The role of a teacher can be defined as the capacity
to provide a certain kind of educational environment--to
lend a certain kind of support to a learner. In the following
pages several kinds of educational types are defined in order
that we can consider the generalist-specialist problem more
concretely.

The educational roles are presented in the form of a proposal for an elementary school organization that employs several actual schools or institutions, each employing a particular teaching model or combination of models designed to further certain aspects of the student's education.

Different Kinds of Education

The recreation of the institution begins with the recognition that we have been trying to make one institution stretch over a variety of educational tasks that really require a large number of institutional forms. To get at this problem let us begin by identifying several of the kinds of education that are critical for today's children and then see if we can figure out the types of institutions and models that best serve those kinds of education.

First, children need to learn the basic skills and historical and geographic knowledge that will enable them to sort out today's world and teach themselves throughout the rest of life. Time-honored reading, writing, and arithmetic are essential, but also needed is a knowledge of contemporary technology. They need to learn to use printed media, especially to learn to read and write, and to communicate through other media (as through dramatics, film and television), as consumers of those media (and for some children as creators). They need a knowledge of the workings of our governing body and of our economic system. They need to be able to compare and contrast our culture with other major world cultures, in terms of politics, economics, art and social dynamics. They need to comprehend the world and the kinds of economic, racial and political problems that beset the nations the world over. We can refer to this need for skills and knowledge as the basic skills and knowledge education of the child. The goals of this education are set outside of him. We want him to acquire this education and feel it is necessary for his development. We want to induce him to learn these things because they are the storehouse of our common culture that he will have to stand on as he builds his individual way in society, and they are the skills and knowledge that he will need in order to relate to the rest of us. Although children differ in the amount of basic education they will absorb, it is a shared education that gives them more in common.

A second kind of education begins with the child. We can think of it as personalized education or education for idiosyncracy. It is designed to help him develop on his own terms and to become as unique as he can. A personalized education begins with the person's own particular talents and special interests and helps him develop these on his own terms. At certain times in his life, a personalized education will simply help him explore his interests. He may read through favorite authors or learn to play a musical instrument or design and build his own rocket. At other times, it may help him build a new career or a depth of knowledge in a certain area. In any case, however, it is desirable that everyone, and not simply the academically talented, have a part of their education devoted to their personal development.

A third kind of education has as its goal to help youngsters learn how scholars work or what we might call academic inquiry. It teaches them how social scientists analyze human culture, and how scientists build and test theories. It helps them try on the ideas of mathematicians and to learn how literature can be analyzed. This kind of education introduces the student to the most sophisticated ideas of his time, and helps him to learn how the academic community continues the struggle for knowledge. It is that kind of education which has been the object of the academic reform movement which has been going on in education since the middle 1950's and which resulted in the curricular changes known as the "New Math," and the "New Science" and so on.

As presently practiced in the schools, academic inquiry is
sometimes dull and sometimes exciting. When it is carried on
in the right way, it is always exciting, for it involves
powerful ideas and systems of ideas. Like basic education,
academic inquiry begins outside the child.

Yet a fourth kind of edcuation introduces the students
to a dialogue on the nature and the future of our society. This
kind of education focuses on the critical issues and values
of our culture. It deals in controversies and helps the
student to sort out the issues in controversies, the kinds
of values over which we are struggling, and to debate alterna-
tive solutions to our collective problems. At the present time,
this kind of education would focus on the problems of alienation
that divide us, on the problems of urbanization and mass
society that are confounding us, on the political issues
on which we are joined as we attempt to forge the future of
our society, both with respect to domestic affairs and inter-
national affairs. This education is critical not only for
the "radicalized" youth who are demanding that at least part
of their education be built around the reconstruction of their
society, but it is just as critical for the apathetic youth
who uncritically conform to the society without questioning
it or engaging in the struggle to improve it. It helps the
student learn to engage in the democratic process, to parti-
cipate in the sharpening of issues and the development of
alternative solutions to problems which confront us.

We could include many others kinds of education--
aesthetic education, human relations training, creativity
seminars, awareness training--the possibilities are many.
However, for illustrative purposes only, let us look more
closely at these four and design a set of institutions to
accomplish them.

A Basic Education

The proper teaching of skills and basic knowledge requires
great individualization. Children learn to read at vastly
different rates, and both good readers and poor readers have
characteristic problems that require individual attention.
Some poor readers are such because they have general language
problems, others because they have a specific problem of some
sort. Some good readers have problems, such as in the appli-
cation of phonics or in the development of their vocabulary,
and these too require individual attention. An institution
that asks a teacher to keep track of the range of individual
differences that occur in reading, writing, arithmetic, basic
skills and knowledge in the social studies and basic skills
and knowledge in the sciences is simply overburdening the
individual teacher with information to process. Teachers
simply cannot do it. If they can diagnose adequately the
individual problems in the basic skills and knowledge area,
a teacher who is asked to teach one subject to a hundred
students, or five or six subjects to thirty students, simply
cannot find the solutions he needs to the panorama of

individual differences that confronts him. However, in the
last few years, we are beginning to experiment with institutional
arrangements that show great promise for this kind of
education. For example, at the University of Pittsburg
Research and Development Center and the Philadelphia Regional
Laboratory Research for Better Schools, there are being developed
and tested general systems for instructing individuals in
the basic skills and knowledge area, in such a way that the
pattern of individual differences is accommodated. Such a
system consists of a diagnostic program in which an individual
is tested and otherwise examined, and his pattern of individual
development in an area such as arithmetic is assessed. On
the basis of that assessment, the teacher makes a prescription
for the youngster. The youngster takes his prescription to a
storage center of self-instructional materials. He is provided
with materials that match the prescription and he works on
those materials, which may be tapes, programmed material,
workbooks, or books with instructions, and as he completes
each section of work, an embedded test provides an indication
of whether he has learned the things which those materials
were designed to teach. On the basis of that assessment,
the prescription is modified, and he continues in the same
manner. Similar systems are being built using films, television
tapes, and other media, and combining them with teacher-
administered instruction. There is presently going on a
major program, sponsored by the United States Office of
Education to develop teacher education programs on the same

basis, with television being used to provide a diagnosis of
the teacher's capabilities and instructional systems being
provided to give the teacher practice in the skills that he
needs help in, to teach him how to use television tape to view
himself and make further diagnoses, and to track his own
progress. At the Far West Laboratory in Berkeley, a series
of self-instructional courses for teachers called Mini-Courses
have been developed using a similar approach.

The kind of school that is good for basic skills and
knowledge education is one that provides for elaborate diagnosis
in the areas concerned, prescriptions based on the diagnosis,
and then treatment or instruction closely tuned to the develop-
mental pattern of the individual. Under such a system, some
individuals complete the course of study in a very short time,
others can take a very long time over the same material. Some
will complete some kinds of development very quickly, and
linger over others, but in any case, instruction is tuned to
the individual.

Personalized Education

Systems like the above, however, cannot very well provide
an education which helps each person to do his own thing, to
explore his own capacity for creativity and his own personal
interests. For that, we need an institution which enables
the student to meet with his teacher on a one-to-one tutorial
basis so that the teacher can explore his interests and
capabilities, and help the student develop a program which fits

those needs and desires. Th[...]or, in addition to being able to help the student find [...] interests and develop his own educational program, has to be backed up by the kinds of instructional resources that can be shaped to an individual need. Some of these resources need to be other teachers, who might work at the school on a full or part-time basis, as artists, musicians, and writers. Good libraries are essential, and can include banks of motion pictures that the student can use to teach himself, television courses, particularly short courses that he can draw on when he needs them, laboratory materials, shops, and so on. The institutional arrangements that make for good personalized education are the tutorial relationship and the battery of open-ended resources backing it up. The existing school as an institution is very poor for this kind of education, perhaps even worse than it is in basic skills and knowledge education. The teacher, meeting with large numbers of students and teaching large numbers of subjects, simply cannot provide the tutorial time necessary. Imagine for example, an English teacher with only a hundred students (and that is very few students for an English teacher) trying to instruct students in grammatical skills, help them learn to read and analyze literature better, trying to provide them with creative writing opportunities, analyzing the products of those opportunities and providing feedback; who in addition to that would be able to meet with interested students on a regular basis to provide tutorial help? It is safe to say that the only kind of tutorial help provided

in such an institution is built around the skills problems
of individuals or is given to the highly talented. The average
student simply cannot be catered to in such a situation.

Learning What the Scholar Does

The third education is to learn how scholars analyze
human society, how they engage in scientific activity, and
how they analyze literature and art. The institutional
arrangements which are appropriate for this enable small
groups of students to get together to analyze critical problems,
applying tools of the social sciences and the other sciences
as they are appropriate. They need the advice and counsel
of skilled teachers who themselves enjoy engaging in scientific
inquiry and who enjoy doing so with young students. In addition,
they need to be backed up by library equipment and by instruc-
tional materials prepared by scholars which introduce students
to the modes of analysis that the scholar uses.

In the present institution, we are beginning to have
instructional materials which can be used for this purpose.
They are materials that have been developed by anthropologists,
political scientists, physicists, chemists, mathematicians
and others, which can help youngsters explore the scientific
disciplines and apply these to the study of their society.
Even in areas like Black Studies, which are relatively new
in the schools, the paperback book has brought much material
to the junior high student and above, although the area is
still lacking. What we do not have is an adequate supply of

trained teachers who are themselves competent to do academic
inquiry and who enjoy doing so. Nor do we have an institutional
arrangement which provides the opportunity for small groups
of students to work together with such teachers with relative
leisure. Physics classes, poured in four or five a day on
the science teacher twenty-five or thirty students strong,
simply cannot engage in the vigorous, leisurely analysis of
significant problems long enough to acquire the modes of
inquiry of the discipline. The present institution, in other
words, has shortcomings on two fronts--one is the proportion
of teachers who are prepared to give this kind of education,
and the second is a kind of institutional arrangement that
does not permit the time-consuming cooperative inquiry char-
acteristic of this kind of study.

Engaging in a Dialogue on the Critical Problems of Society

There may have been a time when it would not have been
critical for the education to induct the student into the
long dialogue over the nature of human society and ways of
improving it, although we doubt it. But it is clear that
today we cannot turn away from this kind of education as
an important component of the student's life. Even if it
were not the case that we were aware of the society's serious
problems, and even if the adult community were not engaged in
serious debate over alternative ways of coming to grips
with the problems: of the internation, the cities, our
relationships one to another, our need to achieve broader

representation, our need for aesthetic improvement--even if
these were not a part of the dialogue of the adult society,
the students would be insisting that we include important
issues, values and alternative solutions in their education.
Until quite recently, there was much less of this kind of
education in the schools than should have been the case because
so many people felt that the schools should steer clear of
controversy, that the study of critical values were matters
for the home and not for the schools. That day is gone, thank
goodness, but the institution still has severe difficulties
in this area for two or three quite obvious reasons. One of
the most important is that there is a conflict between in-
struction and the carrying on of dialogue. A teacher who is
preoccupied with teaching skills to his students, is inhibited
from engaging them in the slow processes of debate and
analyses of social issues. The teacher often feels that when
he gives time to the study of society he is robbing the
student of important skills and basic information that will
enable him to get on later. Second, many teachers have
little experience or taste for this kind of education (while
a few enjoy it greatly and regard it as of paramount impor-
tance). Third, many of the instructional materials that have
been prepared for the consumption of school children have been
deliberately bland and have avoided the issues. Partly this
was from good motives, although they seem questionable today,
or at least are questioned today, in that many educators did

not feel that children are able to deal with the deep problems
of the cities and the international arena. The responsibility
does not lie in the hands of the textbook publishers alone,
for the kinds of materials that were produced no doubt reflected
the kind of market that existed. At any rate, the supply of
materials is slowly changing and some honest efforts are being
made to provide the schools with the kind of information
sources that children need if they are to debate the serious
and interesting issues of the society. The institution, however,
will have to change in a number of ways if there is to be much
effect in this domain, for it has always been organized so that
it tended to isolate the students from the society. Education
is not <u>inherently</u> irrelevant, but it is if it is carried on
in a child's world. The problems of the mayor's office, and
the problems of the Congress take place a long way from the
local public school. Also, the public is in general very
nervous about the school's role in inducting the students into
the hurlyburly of political and social debate. (Parents and
other citizens are afraid that the school might induct the
students to a point of view which conflicts with their own.)
The present controversy over sex education illustrates this.
The public is not afraid that the students will not eventually
learn about sex, what it is afraid of is that the sexual
attitudes that will be developed by the students will not
correspond with their own, and many people would prefer to
see the school leave sex and politics and many social issues

alone, rather than risk the development of a different point
of view from the prevailing one, or the one held by the
parent or concerned community members.

The conditions for dialogue include an immersion in
controversy, an openness of discourse, and an intention to
act. These require an institution which is staffed by
teachers who enjoy dialogue and where students are helped
to engage themselves in deep issues and to see them through.

Putting It All Together

We have outlined four kinds of education, and now we
must talk about the possibilities for accommodating them.
To break with our ways of looking at the school, let us dream
a bit into a future in which we don't have one kind of
school trying to serve all our diverse kinds of children
or fulfilling all the possible kinds of education we want
for children. Instead of one school, let us imagine several
kinds of education, each one to help our children in a parti-
cular way. Let us begin our dream by reiterating our objective
of providing four kinds of education for our children: basic
education, education for idiosyncracy, academic inquiry and
education for dialogue.

We have chosen these four kinds of education because they
are very different in terms of goals, and yet all of them will
seem important to most people. They are all necessary for
a humane, contemporary education. They will not, by any means,
satisfy every man's desire for an education for his children

(or kids' desires, certainly.... ....r are they the only way
of describing desirable education. But they can get us started
on the way to thinking through a new kind of schooling and
schools.

For the schools which we have inherited from our past
generation were designed only for the first kind of education—
basic skills and information. Worse, perhaps, they were designed
better for elementary skills in reading and writing than for
solid engagement with information about a contemporary world.
We have stretched them and pushed them. We have changed
their shape, building them in round shapes, in clusters of
cottages, in television studios and in great libraries. For
all its failings in basic education, however, it is that kind
of education that the present does best. Helping students
develop on their own terms, helping them engage in academic
inquiry, and helping them participate in a dialogue on the
nature of society are things that our school does much less
well than it does basic education, whatever may be its faults
in that direction. In short, we have a one-purpose school,
which does none too well at that one purpose, trying to do
many jobs!

Suppose we dream of a kind of educational system that
encompasses the four kinds of education and which provides
them all to our children with equal efficiency. What would
that educational system (school?) look like? Let us take
each of the four kinds of education in turn and see what each
one needs.

Would we put all these four kinds of education under one roof anywhere? I think not. We can have self-instructional centers scattered throughout our city which can accomplish basic education. Individualized self-instructional systems together with tutors in the basic subjects can work in neighborhoods for the young children and in large library type complexes for the older children. A diagnostic system needs to be developed so that one can determine the stage of each youngster's knowledge and skills, and develop the kind of learning situation appropriate for him. If he cannot learn using self-instructional material, experts in basic education may teach him to read by having him write stories that he reads himself, or by having him select material that he can relate to easily (adventure stories for some, biographies for others, even "Dick and Jane" for some.)

The second kind of education requires a lot of open-ended resources and requires that the student meet his tutor regularly. For the younger children, this also could occur in the neighborhood, and for the older children library-like complexes will be appropriate. In these complexes, we can have banks of television courses, films, self-instructional materials of various kinds, libraries, laboratory equipment, and the other kinds of things that young people need in order to develop on their own terms and follow their own interests. In our large cities we have artists, musicians, artisans, and many others who could work part-time in such centers offering

their services. In neighborhoods and in center cities, art
centers, music centers, literature centers, film studios
and the like can attract a substantial clientele of children.

Academic inquiry in the sciences and mathematics can be
carried on in laboratory centers equipped for the purpose.
Some of the scientific inquiry might be centered around the
traditional academic areas, other parts should be directly
related to our current problems. The study of human ecology
could be carried on right in the environment--our waters are
there to be studied, as is our air, our earth, and the other
things that fill our space. In the social sciences, the
whole human environment is the laboratory: our industries,
our armed forces, and our government and our international
relations. Our local government is here to be studied. Our
problems of overcrowding and transportation and poverty and
of our search for love and joy are everywhere around us and
can be studied. Centers for the study of these things can
be established throughout the city. Some should be in every
neighborhood so that the younger children can have ready access
to the center. Others, for the older children, can be located
where it makes the most sense from the point of view of study.
Around our transportation facilities, for example, are the
possibilities for a myriad of centers and they will not lack
for problems. Our ghettos, our money markets, our banks, our
churches, our theaters, our industries, and our commercial
world are all places in which there should be centers where
children gather to study and reflect on their social world.

And where shall we carry on a dialogue with the children?
Partly, of course, we should use our mass media for this
purpose. Our political parties can present programs beamed
to the young identifying problems from their point of view.
But most of all, they need to be brought together in groups
with the kind of adult that likes to engage in a dialogue with
the young. These places will not look like schools with
children sitting in rows learning dead languages. These
groups would go to our theaters, visit our government officials,
interview delegates to the United Nations, and the other
things that should happen when groups of ten or twelve or
fifteen children meeting two or three times a week with a
wise adult really pursue their inquiry.

The Four Kinds of Education and the Models of the Teaching

We have spoken at length about different kinds of education
and different types of dwellings to house them, but if each
of the various educations are not transmitted in a manner
or manners compatible with its aims, then they cannot be
realized. Thinking of the models as the learning medium,
we may ask ourselves: What models of teaching could be used
by such a school? Let us look at the available alternatives
for just the four kinds of education we have been discussing.

Basic Education. In the previous discussion, we suggested
a variety of behavior modification models (.
but these are not the only possibilities. Group Investigation
(or Reflective Thinking   are

possibilities. The modes of inquiry approach

could be recommended. (As by those who feel that arithmetic

is best learned in terms of academic inquiry into mathematics

or those who feel that reading and "language arts" should be

approached through linguistic inquiry.) Non-directive

approaches have been used in the basic skills and information

areas   Ausubel's Theory of Meaningful

Verbal Learning and his Advance Organizer strategy was con-

structed expressly for the purpose. Taba's Concept Formation

(Chapter Two) and Bruner's Concept Attainment

are particularly appropriate for basic skills and information.

Perhaps a combination of models would be most appropriate

especially because they would accommodate a variety of learning

styles. Systems planning might create self-administering

modular curriculum using behavior modification techniques

(a la IPI) and modules structured around advance organziers

or inductive strategies. Teachers called academic counselors

might stand ready to assist the children and might use

personalized teaching strategies modeled after Rogers or

Hunt   to help the children for whom the

cybernetic system was not sufficient or appropriate to modify

it for them.

Personal Education. Non-directive models

appear superficially to be sufficient for this area. The

non-directive model would certainly make much sense as the

basic pattern for the tutor's behavior, as does Hunt's

Conceptual Systems Model   However, short
courses built on Training Principles
could be available in a kind of educational smorgasbord from
which the student could select. In addition, courses built
on Synectics principles .   could be offered for
those wishing to try to develop their creativity. Awareness
Training   is especially designed for
personal development. Inquiry training exercises might
be made available for training in scientific inquiry.

. Academic Inquiry. The academic inquiry models, such as
Schwab's Science Inquiry Model   , would appear
to be ideal in this area. Groups of students could work
together, trying on the modes of the disciplines and developing
conceptions of the major ideas of the academic areas.

"However, academic inquiry is not, by any means, the
only possibility. The Advance Organizer model
. was developed to teach the structure of the disciplines
and could be used as the major model in this area. Inductive
-and Reflective Thinking   models
also are used to structure academic inquiry, as are Inquiry
Training models   , Group Investigation
and Social Inquiry   . Models developed
from developmental psychologies like Piaget's
provide paradigms on which we could approach academic inquiry.

It could be reasoned that several models should be
combined for this kind of education. For example, Group

The model presented above suggests that the elementary school teacher might be any one of a number of kinds os specialists. He might engage in more that one mode of activity, but it is inconceiveable that very many teachers would stretch over several very different modes.

It is possible to think of the model of the teacher in terms of three dimensions which would define his needed competencies and their limits. One is the age of the children with whom he sould work. A second is domain--the subject or skill area in which he would work. The third is mode or the type of general strategy which he would use. Thus, some teachers might be prepared to work with young children in science with academic inouiry modes. Others to work with older children in media with a mode emphasizing creative thinking. And so on.

In other words, there is a general choice between a generalizized model of the teacher and specialized models, which can be combined to develop the ceonception of the specialist. The use of the more specialized models permits the construction of more compact training programs which might well consume much shorter periods of time than the

present ones. It is possible to conceive of a general
basis for teacher training which might be acquired in
universities or other academic settings, followed by
training in inservice settings for the clinical competencies
necessary to carry out specific modes of education in
specific domains at particular levels of operation.

The Model of the Teacher and Innovation in Education

The generally trained teacher of the past has not
been, on the whole, an effective innovator. He has been
particularly ineffective in handling the institution of
which he is a part in order to bring about changes in it.

One way of conceiving the teacher's inability to
bring about innovative form of education is that while
he may have been able to be effective in the general
role of teacher, he has not had the capacity to teach
himself the new models of education that the innovative
roles have required. For example, let us suppose that
one wants to open a school on the model created by
A. S. Neill at Summerhill. One would, if he did so, expect
to have to sort through a large quantities of teachers
before he found even a small group who would be able to
move into a physical environment and create a Summerhill-
like type of education.

Performance-based approaches to inservice education
can potentially be combined with innovative efforts that
by organizing so that training support systems related to
the appropriate models of the teacher are incorporated into
the innovative effort. For example, supposing we were to
attempt to build an educational program for children
built around learning centers reflecting the formats
described above. A teacher education support system could
be attached to the operation in such a way that teachers
could be trained for the mode that they were to staff.
Those developing the idiosyncratic mode might be trained
to Rogerian counselling methods; those who would staff the
cybernetics system mode might be trained in the instructional
management techniques and behavior modification techniques
to such a precise type of education. Those who would staff
the academic inquiry component or the academic inquiry
centers could be trained to the appropriate teaching models
to support those activities. In other words, the selection
of the modes of education would be folowed by the identi-
fication of the appropriate models f of the teacher, and
these, in turn, would be followed by the construction of
performance-based teacher training systems to enable the
personnel to become competent in the appropriate model.

Chapter Seven

The National Teaching Style

The study of present-day teaching can enhance the development of competency-based teacher education by establishing the configuration of present teaching styles. The outline of this configuration represents the picture of teaching behavior which competency-based education is expected to change. The study of teaching behavior tells us how teaching behavior today compares with the models of the teacher which form the goal of competency-based programs.

The configuration is also useful because it permits an extimate of the magnitude of the difference between the working conceptions of the teacher which are presently acted out and the working conceptions which are sought. Thus value-differences are made more clear.

Our review of the literature on teaching suggests that:

1. There is a national teaching style.

2. It is very different from the goals of present performance-based teacher training programs.

3. It represents a normative conception of teaching which directly conflicts with the technical concepts of teaching which underlie most performance-based approaches.

From 1950 to 1970 there has been an increasing emphasis on the objective study of communication within the classroom. At this point, about eighty instruments have been developed for classifying communications between teachers and students and relating them to each other.

Although the results of this type of investigation have to be interpreted with the knowledge that the objective study of the classroom is still in its infancy, some of the consistent findings are striking especially because of their consistency with respect to the types of styles which teachers display. In fact, the results thus far indicate that we must approach the future of such studies with the proposition that the classroom styles of teachers are notable more for their similarity than for their differences and that it seems possible that there is indeed a national teaching style which has certain definable characteristics.

For example, the Interaction Analysis System developed by Ned Flanders has been the most widely used for studying teaching behavior; and in several dozen studies, the following generalizations seem to be warranted: about two-thirds

of all teacher questions are concerned with narrow lines
of interrogation which stimulate an expected response. In
other words, teachers tend to ask questions for which there
are definite answers, and the preponderance of these
questions is so great that the classroom can be best
described as a place in which teachers ask most of the
questions and in which students are expected to have ready
answers of the convergent type. $(D-3 5.)$

Fewer than ten per cent of teacher communications
in any way respond to a student's idea even to elaborate
it or correct it. In very few of the nation's classrooms
do a significant proportion of the teacher responses deal
with pupil ideas, and we can say that there is not any
likelihood at all that the student ideas are dealt with in
any depth or adequacy in more than a tiny group of the
classrooms.

A very small proportion of the communications in class-
rooms consist of questions asked by pupils. The range in
some studies is only about one per cent to only about four
per cent. Pupils, in other words, contribute very few of
of the questions to classroom discourse. Rarely are more
than ten per cent of the questions asked in a classroom
asked by the pupil and, probably more important, nearly all
of these questions are questions of clarification about

subject matter or directions rather than questions which
represent a line of inquiry by the student.

About nine out of ten of the cycles of communication
in a classroom are initiated by the teacher--meaning that
the game of the classroom is largely controlled by the
teacher as chief player. (D - 1⊢)

Nearly all teachers are extremely direct in teaching
style and the exceptions to this are very rare. Within this
general style, there is considerable variation among teachers.
It appears at this point, however, safe to generalize that
in nearly all cases teachers are using very direct styles
of instruction and the differences between most of them
are variations on a theme rather than representing strategi-
cally different styles.

Evidence to support this generalization comes from the
Joyce, Weil, Wald, Gullion studies of 1970-71 in which
teachers who were deliberately trying different teaching
strategies behaved in ways which are very rarely found in
studies of the natural styles of teachers as they behave in
the classroom. This was true for all of the strategies
which were practiced indicating that a teacher who would be
practicing a counseling strategy, a Group Investigation
strategy, an inductive strategy, or a behavior modification
strategy behaves in ways which are significantly different

from even extremes in classroom style under normal conditions.
One of the really astonishing things was that this finding
seems true for teaching which is engaged in in settings
other than the public school classroom. For instance,
a doctoral dissertation by Browde contained the following
conclusions: that Sunday School teachers do most of the
talking in their classrooms, and most of the talking is
direct; questions are utilized by the teacher, but most
are limited questions requiring one answer; praise is
rare and of the "short comment type," although church
school teachers in Sunday School situations spend less time
justifying authority than do public school teachers, and
their children do about twice as much talking or contribute
about twice as much to the interaction. Thus apparently
Sunday School teachers are a somewhat milder variation on
the theme of public school teacher. (D-93))

Patterns of Behavior As They Develop during Training

Over the last few years Joyce and his associates, Hunt,
Dirr, Brown, Seperson, Peck, O'Donell, Wall, Weil, and
Gullion have engaged in an extensive series of studies into
flexibility in teacher behavior and into the influence that
cooperating teachers have on the behavior of student teachers.
During the course of student teaching student teachers become
less rewarding than they are at the beginning, ask fewer

questions, fewer open-ended questions; but the most
striking change is in the amount of teacher behavior which
invites the student to share in the shaping of the learning
activity either by asking him how he feels about what is
being done or asking him to contribute suggestions. This
behavior is very common at the beginning of student teaching
but almost disappears completely by its end. In other
words, there appears to be a general funneling of those
elements in the styles of the young teacher which might
lead him to have a very different style from the national
norm and which press him toward behaving in the accepted
way. As he becomes less rewarding, more punishing, asks
fewer questions and fewer open questions, plans less with
students, he becomes more generally direct in his behavior. (H-C)

In some studies, feedback using Interaction Analysis
techniques or micro-teaching have arrested this flow toward
direct behavior, but up to this point there have been no
studies in which the flow has been not only arrested but
has been reversed. It is necessary in order to understand
how we can bring about a greater diversity in teaching styles
to understand the dynamics by which the apprenticeship
aspects of training the teacher influence this funneling
of styles. Toward this end, Seperson and Joyce conducted
a study in which they determined correlations between

student teacher and cooperating teacher behavior in the class-
room and found very substantial correlations in most of the
important dimensions of teacher behavior. Student teachers
very rapidly once they have entered the classroom take on
many of the behaviors of their cooperating teacher, and the
process of influence continues during the association
although it is not as strong over time as is the initial
influence.

Rosenshine has conducted a series of exhaustive
reviews of the patterns of teacher behavior and their
relationship to pupil achievement which indicate that
within the national style certain kinds of patterns produce
greater pupil learning than do others:

1. Rosenshine concludes that the findings about
     relationship between teacher praise and pupil
     achievement is mixed with no definite conclusions
     being possible at this time. There appears to be
     some evidence that the most punishing teachers
     retard pupil achievement.

2. About the same kind of finding is true with
     respect to general indirectness of teacher
     behavior. The extremely indirect teacher and the
     extremely direct teacher seem to get different
     kinds of effects in favor of the indirect one,

but the result is not consistent in terms of a
linear correlation.

3. Teachers who ask the most questions seem to
get somewhat better results than others, but up
to this point there is no indication that an
open-ended question is more effective than a
closed question. However, only a few teachers
regularly employ a large proportion of open-
ended questions. $(\mathcal{D} - 35)$

My interpretation is that the variables which are pre-
sently being investigated should not be expected to have
substantial effects so long as they only reveal variations
on the usual theme of teaching. In other words, if some
teachers are somewhat more indirect than others, some
reward a little more than others and others punish a little
more, some ask a few more questions and others a few more
open-ended questions; these differences in dimensions of the
teaching act constitute only slight variations within a
general teaching style. They are differences within a
relatively homogeneous type of behavior inside a relatively
homogeneous institution.

Joyce and Hunt have conducted seve.al studies which
indicate that teaching styles vary somewhat as a result
of teacher personality. Teachers typed as more rigid

apparently have more restricted styles and punish more, reward less, ask fewer questions and fewer open questions and plan less with students than do flexible personality types. The Joyce-Hunt work has been replicated by Murphy and Brown in an independent series of studies with about the same findings. The finding is somewhat disturbing because if teacher personality is too closely related to style, one may not be able to bring about a new style without making first a change in the personality. Fortunately, the Joyce, Weil, Wald, Gullion studies have $(\mathcal{C})$ $(\mathcal{H}\text{-}\mathcal{L})$ indicated that teachers of very different personality types can learn a very large variety of teaching strategies. This finding encourages us to believe that personality variables, while they may account for some of the variations in teaching styles, may not account for as much of the variation in trainability.

The general findings about teacher behavior are exemplified by the data in Table One which shows the results of the study of a group of teachers in the New York City area. Table One shows the frequency of questions asked by those teachers at seven various cognitive levels.

Table One

	Teacher Questions	Teacher Statements	Student Questions	Student Statements
Level 1	10.352	10.534	0.839	12.541
Level 2	5.457	5.270	0.171	7.419
Level 3	3.262	0.623	0.023	2.917
Level 4	0.535	0.010	0.010	0.370
Level 5	0.061	0.101	0.000	0.071
Level 6	0.021	0.000	0.000	0.010
Level 7	0.000	0.010	0.000	0.000

The frequencies indicate that the lower cognitive levels
account for nearly all of the questions asked by the
teachers. The fraction of communications at the high-
order levels is very small. This is the kind of finding
that has been repeated many times in the history of the
study of teaching. It is accompanied by the fact that
so many other dimensions of the teacher's behavior are in
line with this kind of finding. For example, in their
study, Brown and Joyce found that in more than twenty thousand
communications by carefully selected cooperating teachers
in the New York metropolitan area only eleven communi-
cations provided a reward to a student for an activity other
than memorizing something or following directions accurately.

In a study in West Chester County, again of teachers who
were carefully selected by school administrators as being
outstanding, the kind of pattern described earlier was
repeated; and, in addition, out of eighteen thousand
communications which were directed at procedural matters in
the classroom only thirty of those communications involved
the student in a way which permitted his achievement, his
needs, or his ideas to contribute to that determination.
Nearly all of the procedural communications were simply the
giving of directions, sometimes simple and sometimes more
complex but always controlling.

The homogeneity of teaching styles, combined with the relative
homogeneity of curriculums and school organization patterns, indicate that
teaching has been a normative rather than a technical activity. That
is, teachers have been behaving according to a normative concept about
what teaching is, and they, consequently, lool similar when they are at
work. A technical concept of teaching defines teaching as decision-
making skills and teaching strategies which the teacher applies to each
teaching situation. When he does this, the results vary greatly,
for his decisions are different in every case and his strategies
vary as a consequence. Hence, a technical concept of teaching leads to
a more heterogeneous picture than we apparently have at present,
because it assumes that teachers will use their skills to
create a variety of environments tailored to the needs of their
students.

Performance-oriented education has to be built on the assumption
that teaching is a technical matter--a process of decision-making, interacting
with children, developing of content, etc.. The clustering of teaching
behaviot around identifiable norms suggests that it has been an
intuitive, imitative act.

Probably the implementation of performance-based education
will require the socialization of the education profession into a
techical stance which is foreign to the norms of contemporaty practice.

Chapter Eight

What Would Be the Nature of a Comprehensive
Competency-Based Training System?

It will take a number of trials to determine with any
certainty what would be the nature of an effective competency-
based teacher education system. However, the evidence
thus far accumulated from these experiments which have
been conducted (ch.3) combine with the experience of the systems
builders who worked within the Bureau of Research's teacher
education program (ch.5) to form a base on which we can build
emergent but workable guidelines for the development of a
full system.

From the experiments and from software testing it
appears that it is feasible to train teachers to a considerable
variety of decision-making skills and teaching skills and
strategies. What is not clear is whether we can build a
complex training program comprehensive enough to prepare a
teacher for the full role of classroom teacher or even for
more limited specialized roles. There is absolutely no
evidence that this cannot be done, however, and the success
of military programs in training persons to very complex
performance models encourages the belief that a program
to train a teacher is feasible.

The experience in programmed instruction and the forms
that have evolved from it suggest that training systems do

not have to employ minute sequenced steps, but that moderate to large-sized steps are effective and have even greater client acceptance.

Cybernetic psychology has contributed the proposition that quite complex behaviors can be effectively learned under simulated conditions and transferred to field situations. By controlling tasks completely, cybernetic techniques can give superior results to the less controlled demands of field training. To have effective teacher training, however, requires that field situations be compatible with and reinforce training goals--field aspects of training must be compatible with the entire training system. As indicated earlier, the enormously complex roles of teachers in present schools may be untrainable--people may simply be unable to fulfill them.

Principles of Program Planning

Each of the Bureau of Research planners created the elements of their model programs by engaging in the completion of six tasks which are common to systematic program planning. Although systems procedures have by no means been standardized, the six tasks generally appear in any paradigm in systematic instruction although they sometimes exist under different names from the ones with which they will be described here and the order in which they are

accomplished varies quite widely. However, there is a

certain logic in the following order:

1. The creation of a "working model" of the teacher, des-

   cribed as interrelated sets of competencies and as a

   subsystem of the relevant larger environment in

   which the teacher works (teams, schools, communities,

   support systems, etc.).

2. The analysis of this model into streams of related com-

   petencies that can form the basis of components of the

   training system.

3. The selection of component strategies and the develop-

   ment of specifications for components.

4. The creation of the overall training system, especially

   interlocking relationships among components, support

   systems, and communication systems.

5. The organization of management systems to monitor pro-

   gress, program elements, and program testing and revision.

6. The reconciliation of the program with the client (stu-

   dent) and the field (educational system). This step

   must be synchronized to the other steps.

In Chapter Five the Bureau of Research projects were
analyzed in terms of the models of the teacher which were
created and the sets of interlocking components which were de-
veloped by accomplishing the six tasks outlined above.
Competency-based training system consists of a description
of a model or series of models of the functioning teacher.
Each of these models is broken into elements which
represent aspects of the teacher's functioning and which
are accompanied by training systems which attempt through
the use of direct instructional means to accomplish the
development of those competencies and the teachers who are
the clients of the system. Each of the training components
is designed in a "modular" form, which simply means that it
is divided into sections each one of which consists of its
performance objectives, the experiences designed to achieve
those objectives, and evaluation devices to determine whether
the competency has been achieved. Thus, we find a series
of conceptions of the teacher and a set of training systems
to provide competence in aspects of each conception.
Finally, the entire system is organized under a management
system which permits the progress of each student to be

tracked reliably and information to be fed back to the
student himself so that he can modify his performance;
to the faculty so that they can help counsel the student
and provide him with alternative training; and the program
managers and developers so that they can determine which
aspects of the program are functioning well and which are
not and can attempt to respond to the development and
managerial level to correct the problems which arise.

The conceptions of the teacher can vary by level,
domain, and curriculum mode as indicated in the previous
section, and, in addition, one may envision hierarchic
teams in which students may prepare to be assistants or
aides or general instructional developers and managers
(master teachers). It is possible, of course, to try to
produce a generalist, but I cannot suggest too strongly
that a generalist is a collection of specialists. Rogerian
counseling, managing an instructional program, using
simulation games, and leading groups of students in inquiry
are by no means homogeneous behaviors. One can simply not
prepare a general kind of person called a teacher and expect
him to be able to work in every domain, model and level.
It is possible to conceive of a person who has mastered a
number of modes, domains and levels, and such a person might

function as a generalist although I do not think very many

of the people entering teaching have the capacity to reach

such a comprehensive level of performance. It is more

likely to imagine that a certain number of teachers might

be prepared to be general managers of teams and to relate

to a variety of modes which are staffed by personnel

trained in special ways to the special competencies which

are required of those modes.

It seems essential and agreed on that comprehensive

performance-based training has to effect not only the trainee

but the sites in which he is trained. To train a teacher to

a particular type of performance and then find that one does

not have a school in which he can do practice teaching

and practice that type of performance is an absurdity and

would soon make cynics of everyone, including the teacher

trainee. Thus, it is essential that comprehensive performance-

based programs be operated by consortia of institutions

representing training capacity, management capacity, and

institutions which educate children so that the training

programs and the educational activities within the

institutional settings can be coordinated to a high degree.

This seems, particularly important because of the evidence

that performance-based training is most effective when it is

accompanied by a curriculum revision and the availability

of materials for children. It is hard to imagine, for

example, that one could train a teacher to function

effectively in the I.P.I. system unless he had one present

and operating with children. At any rate, assuming that one

might be able to do so, it would be absurd.

A comprehensive performance-based system relying,

heavily, as it would, on modular instructional systems, should

almost certainly use cybernetic techniques, especially

simulation, in many of the phases of training. Nearly all

of the systems models use simulation, not simply because it

is a fad, but because it permits training to occur in

unified sequential segments that relate to the other.

Chapter Nine

What Would Be the Nature of a Competency-Based Teacher Center?

The function of a competency-based teacher center within an educational

area (a complex of schools serving a defined geographic area) is to provide

three types of flexible teacher education support to the educational effort:

1. General support through training to improve teacher competence

within defined teacher roles. This support should be guided by

diagnosis of teacher performance in the area with training concentrated

in the domains of greatest need in terms of the educational priorities

of the area. For example, if a priority in the area were English as

a Second Language for young children, training might be concentrated

but not limited to competency in that domain.

2. Flexible support to teachers by helping them diagnose their per-

formance and receive training to increase specific competencies in

terms of their needs. For example, if a teacher wishes to improve

his skills in affective education or in inductive strategies, or in

diagnostic skills, training would be provided on the most individual

basis possible.

3. Support to innovative efforts within the area. For example, a

teacher center should be capable of providing support to all phases

of a general innovation like the Parkway School in Philadelphia or

to a thrust in school organization (such as the establishment of

open-plan schools built around learning centers) or to a curriculum

reform thrust (such as the improvement of instruction in a curriculum

area such as science or reading).

To fulfill these missions, a teacher center will have to develop a

combination of precision and flexibility which probably cannot be obtained

without the magnitude of development effort required to create a comprehensive teacher education program.

Each of the three missions of a teacher center requires diagnostic capability, a flexible modular training system, and a management system for relating the two, monitoring effectiveness, and organizing program revision.

A teacher center need not offer all possible services but could be developed to accomplish limited training objectives or types of training support within the three types of mission, but even in a limited center precision of diagnosis, training and management would require a complete system of interrelated diagnostic, training, and management functions.

Thus the effectiveness of a center will depend on the definition of working models of the teacher or aspects of teacher performance, and the development of training systems to bring about competence within the models of performance. If this is accomplished, then the mode of functioning of a teacher center can be diagrammed thus:
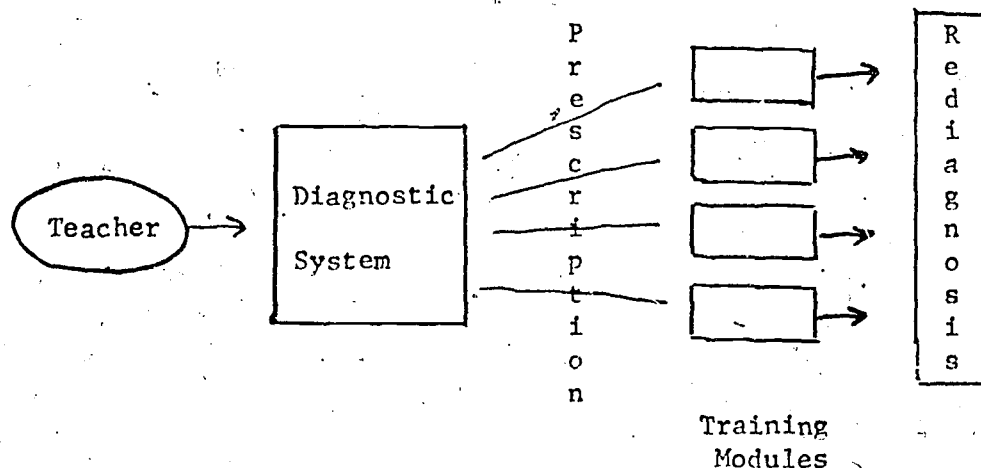
Without a reasonable flexibility in training components the mission of a teacher center would have to be quite specific and limited. The greater the array of training components, the larger the mission of support can be and the greater its flexibility in meeting teacher needs.

Whether training and assessment occur in field settings, laboratories closely related to field settings, or at univeristies, a great deal of software is necessary to bring a competency-based inservice center into being. Fortunately, a great deal of software is being produced presently and nearly all of it is realted to specific competencies.

As in the case of any teacher education program, the selection of the goal. in this case the performance model of the teacher, is of vital impor- tance because it reflects a preference for the kinds of education teachers will be trained to provide for children.

Appendix

The Enormous Software Problem

One of the requirements that distinguishes competency-based teacher education from other approaches to it is the need for great quantities of software in order to implement it. The software is needed to serve three purposes:

1. Assessment. Assessment tasks of a variety of types require materials which present the tasks, rating forms and record-keeping devices.

2. Instructional. To present instructional alternatives to students, extensive materials are required. The greater the individualization of the program and the greater the array of alternatives for pursuing objectives, the more elaborate the software has to be.

3. Management. To track progress and provide information to students and faculty, to coordinate support systems, and to enable counselors and students to achieve control over events, an elaborate software complex is required. (See pp. 204 to 237.)

The creation of enabling software is in its infancy, and most of the products to date are fragmentary. The accumulation, however, is beginning to be substantial and organizations such as the Far West Regional Laboratory have

developed rigorous product development and testing paradigms·
which have considerable promise.

In the following pages there is a description of
presently-available material with illustrations of its
applicability in a performance-based teacher education
program.

Background of the Project

Competency or performance-based education grew out of the recent, nation-wide effort to improve·teacher education. Motivated by the same desire, the National Teacher Corps requested its various local programs to move toward competency-based education in the design of their own training programs. This is no small task, as developers of the Elementary Models of·Teacher Education programs can attest. ·Merely conceptualizing a sound, integrated performance-based program is a full-time job. Coupled with the·details of implementation --developing or obtaining the material supports, training and coordinating the teacher education faculty and providing a comprehensive management schema-- the job is monumental, especially if programs begin from scratch.

Recognizing the difficulty of the task, the National Teacher Corps provided its local programs with assistance in their efforts to develop ·competency-based training programs. First, consultant services and workshops explaining the rationale and procedures for designing a comp- tency-based program were provided. Second, Teachers College, Columbia University, was asked to identify and describe performance-based materials that were available and could be incorporated into local Teacher Corps programs. This report is the result of that effort.

Organization of the Report

The framework for the report emerged from our desire to maximize its potential uses. At the beginning we imagined a simple list and des- cription of performance-based materials -- an annotated directory. However, as we began identifying and previewing the materials, we discovered that the state of performance-based materials was not highly developed. Some means of analysis was required to reveal the substantive gaps and behavioral limitations. Second, a functional classification system was needed to facilitate programmatic decision-making and integration. The report is intended, then, to both describe and analyze, to serve the purposes of materials selection and decision-making at the program- design level and to point up the present state and future needs of perfor- mance-based materials.

These purposes are reflected in its organization. The sections include this introduction which outlines the background of the project and the. organization of the report, describes the procedures for selecting, classi- fying and describing the materials, and provides a summary analysis of the present status and uses of the materials; an alphabetical Listing of Competency-Oriented Materials for Teacher Education; A Classification of Competency-Oriented Materials; Descriptions of Previewed Materials; Short Descriptions of Non-Previewed Sources; and Additional Sources About Competency-Based Education. The introduction includes two descriptive charts. Figure B compares the format of the sources: the kind of behavioral objective attended to, the activity structure of the program, and the administrative features of the program. Figure A identifies the Behavioral Status.

Selecting the Materials

Some clarification on the nature and scope of the materials selected for this report is necessary because several kinds of sources related to performance-based education are presently available. Our focus was on identifying competency-oriented materials that would be the basic software for instructional modules. This parameter excludes general sources about competency-based education, as well as specifications for modules. However, in the course of our search, some excellent examples of these two types of materials did come to our attention and we have listed their sources in a special section of the report.

The substantive range of the materials includes "traditional" teacher education content as well as preparation for new educational forms and positions. Materials for training the teacher supervisors or team-leaders (a Teacher Corps staff position) were also included. Though our search was conducted for Teacher Corps whose programs involve preservice teacher training, the materials we located are applicable to inservice as well as preservice uses. In fact, the distinction is probably a spurious one!

The crucial criterion, of course, in selecting these materials was whether their form met the requirements of performance-based education. Initially, this meant the specification of behavioral objectives, the provision of adequate measures to assess those objectives and the identification of required levels of performance. It became evident very quickly that few programs met these behavioral standards (hence, the shift in the title of this report from Competency-Based to Competency-Oriented Materials for Teacher Education). Out of necessity our criterion loosened to include materials either explicitly or implicitly specifying behavioral objectives or for which behavioral objectives could be readily ascertained and/or those materials that provided a semblance of criterion measures, however behaviorally imperfect. In practice, this excluded only the usual textbook or printed sources and filmed sequences. Programmed texts and filmed sequences accompanied by provisions for analysis and discussion were included.

Probably many more sources than those described here meet this liberal behavioral criterion. This list cannot be viewed as exhaustive but merely exemplary of the kinds of products being developed. We know, for instance, that there are now many materials describing behavioral objectives -- what they are, the different kinds, and how to write them. We have not located nor listed all of those sources here. The relative state of abundance is generally true in highly defined areas such as behavioral objectives. In areas of less definition, the repository of materials is thinner.

Over fifty sources were contacted by telephone, letter and personal contact, including directors of the Models of Elementary Teacher Education programs, the Regional Educational Laboratories, the Research and Development Center for Teacher Education, selected commercial sources, technical assistance persons for Teacher Corps programs, and colleagues in teacher education. The result is a listing and description of approximately sixty material sources. Most of these have been previewed by the authors of this report. A few have been described by the developers of the materials. All of the materials are available or will be available shortly.

Format of Descriptions

There are two sections of materials descriptions. The first includes sources that have been previewed and are generally available. These are described and analyzed rather extensively. Sources that were not previewed or are available on a limited basis make up the second section of short descriptions.

The format of the descriptions in section one includes the following information: title; author or developer; publisher or source; cost; special ordering instructions; type of materials such as printed material, video-tapes, filmstrips; a description of the purpose, content, organization and administrative features of the materials; a description of the sequence of activities teacher-candidates would be engaged in while using the materials e.g. discussion, reading, micro-teaching; objectives and criterion assessment, an analysis of the present behavioral status and potential of the materials; and possible uses in existing teacher education programs such as clinical experiences connected with student teaching or methods courses.

Several terms are used interchangeably throughout the descriptions -- student, participant, teacher and teacher-candidate refer to the preservice or inservice teacher-in-training, the target-audience for these materials. Micro-teaching means an actual teaching experience with children while peer-teaching refers to a simulated teaching experience with one's peers such as role-playing.

Classification and Analysis of Materials

To facilitate decisions about materials selection and program design the previewed materials described in this report have been analyzed in four ways. First, an eleven-category system was developed for classifying the major competency-type, substantive emphasis or function of the materials. The categories are:

1. Basic Interactive Teaching Skills
2. Instructional Planning and Design Skills
3. Teaching Strategies
4. Analysis of Classroom Activity: Interaction Systems and Guides
5. Instructional Decision-making (Problem-solving)
6. Student Diagnosis and Evaluation
7. Foundations of Education
8. Content Areas
9. Media and Instructional Technology
10. Educational Staffing and Instructional Organization
11. Staff Development

This is a crude, hybrid classification system reflecting both emergent teacher education programs built upon behavioral competencies and those built upon a traditional, subject-matter course structure. This particular schema, probably a result of intuition and intention, initially served as an impressionistic taxonomy that provided some order to our search. It is

included in this report for its heuristic value in program design and materials selection. Many alternative classification systems are possible such as those based on role conceptions of the teacher or program components. This schema does not dictate program design; it is simply a vehicle for perceiving the relationships among behavioral competencies, program content or materials and program structure.

The materials have also been analyzed for their behavioral status, th: kinds of behavioral objectives attended to, their activity structure and administrative features. The format for each of these analyses can be seen in the figures below.

Figure A

Assessing the Behavioral Status of
Competency-Based Materials
for Teacher Education

Title	Needs Specification of Objectives	Objectives Need Refining	Needs Assessment Measures

Assessment Measures Need Refining	Needs Level of Performance Identified	Complete

Figure B

Assessing the Objectives,
Instructional Format, and Administration of
Competency-Based Materials
for Teacher Education

Title	Objectives						Instructional Format						Administration				
	Cognitive	Demonstrative	Consequential	Expressive	Psychological	Affective-	Micro-teaching	Simulated Teaching	Group Discussion	Writing	Observation-	Reading-Writing	Self-Administered (Individual)	Self-Administered (Group)	Instructor	Coordinator	

Further explanation of the categories and the actual classification
and analysis charts can be found in the section on Classification and
Analysis of Competency-Oriented Materials.

Present Status of Materials

An analysis of the materials described here reveals some interesting
patterns in regard to the degree of "completeness" they exhibit. This
quality of completeness has several aspects.

In the section on Classification of Materials a chart is included which
indicates the "behavioral" status of each item. Very few materials are
rated as complete in the sense that they have: specific behavioral objectives
stated; adequate assessment measures provided; required levels of per-
formance identified. About one third of the materials need further spe-
cification of objectives. In most instances these objectives seem implicit
in the materials and can probably be produced locally without much diffi-
culty. One fourth of the materials lack assessment measures, but again
in many instances these can be derived fairly readily from the existing
materials. Almost all of the materials lack identification of required
performance levels. This is the area that needs immediate work at the local
level if a competency-based program is to be instituted. Some might consider
this an inadequacy of the materials, but it may well be that identification
of performance levels is a decision best reserved for those using the materials
in the local situation.

Another aspect of "completeness" of materials is the range of types of
behavioral objectives represented. This information is also included
in the section on classification. Five types of objectives have been
identified in the Handbook for the Development of Instructional Modules
in Competency-Based Teacher Education Programs. They are: cognitive objectives;
affective objectives; psychomotor objectives; demonstrative objectives
(demonstrating teaching behaviors); consequential objectives (demonstrating
changes in pupil behavior); expressive objectives (experience only). The
available materials are heavily (over half) in the area of cognitive objectives.
About one third of them are based on demonstrative objectives. None of them
are designed for consequential objectives, and relatively few for expressive,
affective, or psychomotor objectives. It will be fairly easy for local
programs to design modules around expressive or psychomotor objectives,
but much thought needs to be given to the designing of materials for affective
and consequential objectives. Probably the best way to move immediately
is to revise and extend existing materials using demonstrative objectives.
With minor additions many of these could be developed to include conse-
quential objectives.

The materials seem to be more complete as regards variety of instructional
activities involved. The type of activity most frequently used is an
observing-writing format. Observations may be in actual settings, such as
classrooms, but more often they are based on films, videotapes, or slide-tapes.
Students describe their observations, or respond to prepared questions, in writing.
Several other types of learning activity are well represented. These are:
reading-writing format; group discussion format; simulated teaching format; actual
(or micro) teaching format. This variety of instructional formats is a
strong point of the materials, for it enables the program planner to provide
a more balanced learning experience.

Much the same variety exists as regards types of administrative pro-
cedures. A large number of materials are designed for self-administration
by individual students. An almost equal number are developed for administration
under the guidance of a knowledgeable instructor. A very few are organized
for use with a group under the guidance of a "coordinator," or an instruc-
tor who is not particularly knowledgeable in the field. Several materials
are set up for self-administration by small groups of students. Varying
the administrative procedures also provides strength to a program, but the
large number of materials designed for administration by a knowledgeable
instructor emphasizes the need for staff retraining implicit in reorganizing
for performance-based programs. Most teacher education faculties are not
presently knowledgeable in the areas that these materials emphasize.

An interesting sidelight to this consideration of "completeness" of
materials is the fact that the variety which exists may well be a happy
accident. In analyzing the materials it became evident that each regional, lab
or development center has tended to specialize in a particular type of material.
For example, the Far West Lab's minicourses involve cognitive and demonstra-
tive objectives in a micro-teaching format which also makes use of observing-
writing activities. The minicourses are all self-administered by individuals.
Most of the programs developed by the Northwest Lab are based on demonstrative
objectives in a group discussion format, and are administered by a
knowledgeable instructor. Materials produced by the Research and Development
Center for Teacher Education tend to be organized around cognitive objectives,
for use in a reading-writing format, and they are self-administered by
individuals. It is fortunate that this tendency to specialize resulted in
development of a variety of types of materials, but it is important to note
that a program must tap several sources in order to take advantage of
this phenomenon.

Considerations for Program Planning: Individual Differences, Sequence and
Integration
    The question of variety of available materials is important if one
assumes that a teacher education program should be responsive to individual
differences. Typically, materials developed to enhance individualization
of instruction respond to only one or two aspects of differences: differences
in rates of learning and differences in areas of interest. Only rarely is
there an opportunity for the student to vary his instruction relative to
preferred amounts of structure or direction, preferred styles of thinking,
preferred means of communication, or preferred amounts of human interaction.
A program that is truly geared to individual learning patterns needs to
take these factors into account.

    Only a few of the materials reviewed here provide options within them,
which would allow for adaptation to individual differences of the latter four
types mentioned above. Almost all of these options are in the area of
administration of materials; for example, the materials on questioning
skills can be self-administered by an individual or by a group. This parti-
cular type of flexibility would seem to relate chiefly to differences in
preferred amounts of human interaction.

    Happily for the program planner who does wish to provide more individual
options, there is some variety of both instructional format and administra-

tion of materials within each category area. Some variety of types of objectives also exists within each category area. This variety can be seen by studying the charts which appear in the section on Classification of Materials.

Consider the problems and possibilities in relation to selection of materials in the category of "basic interactive teaching skills." Under the topic of questioning skills there are two types of materials available. The minicourse materials utilize a micro-teaching format and are self-administered by an individual, while the Allen materials (General Learning Corporation) on questioning skills utilize a simulated teaching format and can be self-administered by either an individual or a group. It is probably not economically feasible to have both types of materials available to teach an area such as questioning skills. But the program planner might provide variety and balance by choosing to use (for example) the minicourse to teach questioning skills, the Discovery Teaching Simulation materials to focus on reinforcement techniques, and "Facilitating Inquiry in the Classroom" to focus on interactive techniques related to problem solving.

All of these three items deal with questioning skills. The latter two deal with a number of other skills in addition. The Discovery Teaching materials utilize a simulated teaching format and can be administered by a group or by a coordinator. "Facilitating Inquiry in the Classroom" utilizes a group discussion format and is administered by a knowledgeable instructor. These three items, then, provide a variety of options to the student within the general category of interactive teaching skills. By careful selection of materials with an eye to the question of variety and balance, the program planner can provide options within each category area as well as options across category areas, thus achieving a good deal of flexibility in providing for individual differences in students.

Another important consideration is effective sequencing of materials. One possible basis for sequencing is the concept of "progressive increase of involvement." On this basis one might decide to begin with systems for observing children and/or classroom interaction (Analysis of Classroom Interaction; Foundations of Education), move to pre-active teaching skills (Instructional Planning and Design; Student Diagnosis; Decision-making), and finally to interactive teaching skills (Basic Interactive Teaching Skills; Teaching Strategies).

Another way to organize materials in sequence might be in relation to generality of ideas or skills. Some curriculum planners opt for starting with the more general and working to the more specific. In this type of organization, materials such as the Northwest Lab's "Facilitating Inquiry in the Classroom" and "Development of Higher Level Thinking Skills" would precede materials such as the minicourse on "Effective Questioning."

Materials might also be sequenced in terms of type of behavioral objective. One would begin with a set of materials organized around an expressive or affective objective, move to materials geared for a cognitive objective, and then progress to materials designed around demonstrative and consequential objectives. This cycle could be repeated

several times in relation to various topics.

A program which is highly individualized may leave decisions of sequence of experiences up to the individual student. But even in this instance it will be important to suggest possible alternatives to the student. He will need to understand alternatives in order to exercise his options effectively.

A third consideration in program planning is the integration of these materials. For example, it is possible that the assessment measures in the category of basic interactive teaching skills could be behaviorally improved by adapting the materials from Observation Systems and Guides, or that measures for Planning and Design Skills could be coordinated with materials from Student Diagnosis and Evaluation. In addition to improving the behavioral status, coordination of materials can produce a more substantively integrated, in-depth educational experience. Materials can be selected so that learning activities in methods courses, foundations courses and clinical experiences dovetail with each other. For example, in a student's laboratory experience he can be learning a science inquiry teaching strategy and the basic interactive skills for inquiry (e.g. Facilitating Inquiry in the Classroom), while in a Science Methods block he is completing a sequence on instructional planning and design (e.g. The Teaching of Science: A Self-Directed Learning Program). Back in the clinical block he may then engage in instructional decision-making tasks.

Decisions, Decisions, Decisions

There are several decisions that need to be made prior to selection of materials for a program. Some of the questions that might be asked appropriately are:

1. What types of levels of behavioral objectives do we wish to emphasize most strongly?

2. What types of instructional format do we believe to be most effective?

3. What types of administration of materials will be most feasible for our program?

4. How much retraining of staff will be necessary for use of various materials?

5. How much revising of materials (or development of new materials) are we willing and able to do?

6. What aspects of individual learning patterns do we wish to provide for?

7. What basis will we use for sequencing of materials?

8. What materials seem to provide the most variety of uses, in the most economical way?

The framework for describing and analyzing programs that we have used in this report may provide a basis for making some of these decisions.

A LISTING OF
COMPETENCY-ORIENTED MATERIALS.
FOR TEACHER EDUCATION

Title and Author/Developer	Source	Page[°]
Analysis of Teaching Behavior Gene E. Hall	Research and Development Center for Teacher Education The University of Texas Austin, Texas	53 33,51
The Assessment Training Kit C. Lisa Lewis and S.L. Menaker	Research and Development Center for Teacher Education University of Texas Austin, Texas	55 51

The Basic Course: Teaching is
    Learning to Listen; Activities
    in Metaphor
W.J.J. Gordon and Tony Poze
	Synectics Education Systems
	121 Brattle Street
	Cambridge, Massachusetts
	                     02138
		56
		31

Basic Teaching Tasks; A Teaching
    Laboratory Manual for
    Beginning Teacher Candidates
O.L. Davis, Thomas B. Gregory,
    Marcella L. Kyselka, Keven R.
    Morse, B.R. Smoot
	Research and Development
	Center for Teacher Education
	University of Texas
	Austin, Texas
		58
		21, 25,
		29, 31

*Behavioral Objectives Package	Southwestern Cooperative Educational Laboratory 117 Richmond Drive N.E. Albuquerque, New Mexico 87106	117
Cameras in Education Educational Media Laboratories	Technifax Education Division The Plastic Coating Corpora- tion Holyoke, Massachusetts 01040	59 47
Classroom Behavior Analysis and Treatment Robert L. Spaulding	Dr. Robert L. Spaulding, Dir. Child Development Institute San Jose State College San Jose, California 95114	61 33, 37, 51
Classroom Management Simulation System Paul Twelker	Simulation Systems Program Teaching Research Division Oregon State System of Higher Education Monmouth, Oregon 97361	62 35

* Asterisked titles are found in the Short Descriptions section.
° First number refers to the description, others to the classifications.

Title and Author/Developer	Source	Page
Competencies in Mathematics, Instructional Strategies: Division E. Glenadine Gibb	Research and Development Center for Teacher Education University of Texas Austin, Texas	64 29, 31 41
Competencies in Mathematics, Instructional Strategies: Numeration E. Glenadine Gibb	Research and Development Center for Teacher Education University of Texas Austin, Texas	65 29, 31, 41
Competencies in Mathematics, Mathematics in the Elementary School: An Overview E. Glenadine Gibb	Research and Development Center for Teacher Education University of Texas Austin, Texas	66 29, 41
*Conventional Media Educational Media Laboratories	Technifax Education Division The Plastic Coating Corporation Holyoke, Massachusetts 01040	117
Critical Moments in Teaching (film series) and Guide for Independent Discussion and Study David Gleissman, editor	Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York, New York 10017	68 35, 45
Developing Effective Instruction	General Programmed Teaching P.O. Box 402, 424 University Avenue Palo Alto, California 94302	70 29, 37, 47
Development of Higher Level Thinking Abilities John A. McCollum and Rose Marie David	Northwest Regional Educational Laboratory 710 S.W. Second Avenue 500 Lindsay Building Portland Oregon 97204	71 21, 25, 29, 31, 37, 41
Discovering New Dimensions in the Teaching Process Greta Morine, Robert Spaulding, Selma Greenberg	Intext Educational Publishers College Division Scranton, Pennsylvania 18515	72 33, 51
The Discovery Teaching Game Paul Twelker and Donald Kohl	Simulation Systems Program Teaching Research Division Oregon State System of Higher Education Monmouth, Oregon 97361	73 35

A CLASSIFICATION OF COMPETENCY-ORIENTED MATERIALS
FOR TEACHER EDUCATION

1. Basic Interactive Teaching Skills

   General Communication and Presentation Skills
   Questioning Skills (Modulating Cognitive Level and General Discussion)
   Structuring
   Sanctioning
   Problem-Solving (Inquiry)
   Group Dynamics (Interpersonal Communication Skills)

2. Instructional Planning and Design Skills

3. Teaching Strategies

4. Analysis of Classroom Activities: Observation Guides and Interaction
   Systems

5. Instructional Decision-making (Problem-solving)

6. Student Diagnosis and Evaluation

7. Content Areas

8. Foundations of Education

9. Media and Instructional Technology

10. Educational Staffing and Instructional Organization

11. Staff Development

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BASIC INTERACTIVE TEACHING SKILLS

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator

General Communication and Presentation Skills

1. Basic Teaching Tasks:A Teaching Laboratory Manual for Beginning Teacher Candidates
   --Clarity of Instructional Objective
   --Presentation (introducing, organizing, using audio-visual aids, closing, making assignments)
   --Refocusing

   | x | | x | x | | | x | | | | x | | | | | | | x | |

2. Teaching Skills-Presentation Skills
   --Completeness of Communication
   --Lecturing
   --Use of Examples
   --Planned Repetition

   | x | | x | x | | | | x | | | x | x | | | | x | x | | |

3. Teaching Skills-Response Repertoire
   --Verbal Responses
   --Non-verbal Responses
   --Combined Verbal and Non-verbal

   | x | | x | x | | | | x | | | x | x | | | | x | x | | |

Questioning Skills (Modulating Cognitive Level and General Discussion)

1. Basic Teaching Tasks:A Teaching Laboratory Manual for Beginning Teacher Candidates
   --Interaction
   --Questioning as a classroom strategy

   | x | | x | x | | | | x | | | x | | | | | | | x | |

2. Development of Higher Level Thinking Abilities
   --Questioning Strategies and Discussion Skills

   | x | | | x | | | | x | | | x | x | x | | | | | x | |

3. Guided Self-Analysis: Teaching for Inquiry

   | x | | | x | | x | x | | | | x | | x | | | | x | x | x |

| | | Behavioral Status | | | | | Objectives | | | | | Instructional Format | | | | | Administration | | | |
		Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
4.	Minicourse on Effective Questioning in a Classroom Discussion (Elementary)					x	x	x				x			x		x			
5.	Minicourse on Effective Questioning in a Classroom Discussion (Secondary)					x	x	x				x			x		x			
6.	Minicourse on Individualizing Instruction in Mathematics					x	x	x				x			x		x			
7.	Minicourse on Thought and Language: Skills for Teaching the Child With Minimal Language Development					x	x	x				x			x		x			
8.	Teaching Skills-Questioning Skills (Secondary) --Fluency in Asking Questions --Probing Questions --Higher Order Questions --Divergent Questions	x		x	x			x					x		x		x	x		
9.	Teaching Skills-Questioning Skills (Elementary)	x		x	x			x					x		x		x	x		
Structuring																				
1.	Guided Self-Analysis: Teaching for Inquiry	x			x		x	x				x			x	x	x		x	x
2.	Minicourse on Individualizing Instruction in Mathematics				x		x	x				x			x		x			
3.	Teaching Skills-Creating Student Involvement --Set Induction --Closure	x		x	x			x				x			x		x	x		
4.	Vimcet Filmstrip-Tape Program #6 (Set Induction)	x						x							x		x			

Behavioral   Instruc-
Status.   Objectives   tional Admini-
                       Format   stration

	Complete	Need specif. of obj.	Need Assessn. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
Sanctioning (Reinforcement)																			
1. Basic Teaching Tasks: A Teaching Laboratory Manual for Beginning Teacher Candidates --Interaction		x	x	x			x					x					x		
2. Discovery Teaching Simulation System, Phase II --Indirect Guidance and Encouragement --Reinforcement of Exploration			x	x			x					x							x
3. Distar Series: Training Teachers and Paraprofessionals in Englemann-Becker Follow-Through Classrooms		x	x	x		x	x					x	x	x				x	
4. Guided Self-Analysis: Teaching for Inquiry		x		x		x	x					x		x	x	x		x	x
5. Teaching Skills-Increasing Student Participation --Reinforcement --Recognizing Attending Behavior --Silence and Non-verbal Cues --Cueing		x	x	x			x					x	x			x	x		
6. Vimcet Filmstrip-Tape Programs #12 Knowledge-of Results #15 Discipline in the Classroom (Beh. Mod.)	x						x						x			x	x		
Problem-solving (Inquiry)																			
1. Development of Higher Level Thinking Abilities --Interpretation of Data --Application of Knowledge		x		x			x				x	x	x					x	

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
2. Discovery Teaching Simulation System, Phase I; Phase II --Focusing on the Problem --Springboards			x	x		x	x				x		x			x	x		
3. Facilitating Inquiry in the Classroom				x		x							x					x	
4. Guided Self-Analysis: Teaching for Inquiry	x			x		x	x				x			x	x	x		x	x
5. Teaching for Problem Solving: A Teaching Laboratory Manual --Creating Incongruity: Presenting the Problem --Attacking Incongruity: Formulating Hypotheses			x	x		x						x						x	

Group Dynamics (Interpersonal Communication Skills)

1. Interpersonal Communications				x		x	x					x						x	
2. Systematic and Objective Analysis of Instruction (Phase One)				x		x	x					x	x	x	x				x

INSTRUCTIONAL PLANNING AND
DESIGN SKILLS

Categories:
1. Determining Instructional Objectives
2. Instructional Activities (deriving content and planning lessons)
3. Appraisal and Assessment
4. Individualizing for Instruction
5. Grouping

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Basic Teaching Tasks: A Teaching Laboratory Manual for Beginning Teacher Candidates --Clarity of instructional objectives (1,2)		x	x	x		x					x							x	
2. Competencies in Mathematics (1,2,3)				x		x								x		x			x
3. Developing Effective Instruction (1,2,3)	x					x								x		x			
4. Development of Higher Level Thinking Abilities (1,2)	x					x		x			x	x	x					x	
5. Instructional Design: A Self-Directed Learning Program (1,2,3)						x	x							x		x			
6. Minicourse on Individualizing Instruction in Mathematics (1,2,3,4)						x	x	x			x			x		x			
7. Minicourse on Organizing the Primary Classroom for Independent Learning and Small Group Instruction (4,5)						x	x	x					x	x	x				
8. Teaching in IPI Mathematics, Vols. One and Two (4)	x					x								x		x			
9. The Teaching of Science: A Self-Directed Learning Program (Instructional Design for Science Teaching) (2,3)																			

10. Team Teaching Modules
    --Module III (2)
    --Modules V and VI (4)
    --Modules IV (5)

11. Vimcet Filmstrip-Tape Program
    #1 (1)   #9 (2)   #18 (3)
    #2 (3)   #10 (2)   #6 (2)
    #3 (1)   #11 (2)
    #4 (1)   #13 (2)
    #5 (2)   #14 (2)
    #7 (3)   #16 (3)
    #8 (2)   #17 (2)

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
10.					x	x								x		x			
11.	x					x								x		x	x		

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. The Basic Course: Teaching is Learning to Listen; and Activities in Metaphor		x	x	x		x									x	x			
2. Basic Teaching Tasks: A Teaching Laboratory Manual for Beginning Teacher Candidates --Presentation (The active lecture)		x	x	x			x					x					x		
3. Competencies in Mathematics --Instructional Strategies: Division --Instructional Strategies: Numeration					x	x									x	x			
4. Development of Higher Level Thinking Abilities		x		x			x				x	x	x						x
5. Distar Series: Training Teachers and Paraprofessionals in Englemann-Becker Follow-Through Classrooms		x	x	x		x	x					x	x	x					x
6. Facilitating Inquiry in the Classroom					x		x						x						x
7. Modifying Classroom Behavior		x		x		x									x	x			
8. Teaching Achievement Motivation	x									x	x	x	x					x	
9. Teaching for Problem-Solving: A Teaching Laboratory Manual			x	x			x					x							x

ANALYSIS OF CLASSROOM ACTIVITIES: OBSERVATION GUIDES AND INTERACTION SYSTEMS

Categories:
1. Comprehensive Pupil-Teacher Interaction Patterns
2. Pupil-Teacher Interaction: Socio-Emotional Climate
3. Teacher Questioning Patterns
4. Teacher Response Patterns
5. Child Behavior Patterns
6. Teaching Strategy
7. General Observation Guide
8. Levels of Thinking

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Analysis of Teaching Behavior (Science Teaching) (1,2)		X		X	X						X	X						X	
2. Classroom Behavior Analysis and Treatment (5,4)	X	X		X		X	X						X					X	
3. Discovering New Dimensions in the Teaching Process (1,3,4,6,8)	X			X		X	X				X		X				X	X	
4. Films on Cognitive Development (5)	X		X	X		X							X					X	X
5. Guided Self-Analysis: Teaching for Inquiry (3,4,1,8)	X			X		X	X				X		X	X		X		X	X
6. Intellectual Development of Babies (5)	X	X		X		X							X			X		X	
7. Interaction Analysis (2)				X			X						X					X	
8. Introduction to Early Childhood Education (7)		X		X		X			X				X				X	X	
9. Learning Interaction Analysis: A Programmed Approach (2)	X			X		X							X				X		

INSTRUCTIONAL DECISION-MAKING
(Problem-solving)

Categories:
1. Human Relations
2. Teaching Style, Skill or Methods
3. Students with Academic Problems
4. Students with Personal Difficulties
5. Cultural Conflict
6. Grading
7. Classroom Organization
8. Classroom Management
9. Educational Staffing and School Organization
10. School/Community Relations
11. Curriculum

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Classroom Management Simulation System (8)				X		X						X				X		X	
2. Critical Moments in Teaching (1,2,3,4,5,6,7,8)		X	X	X		X							X				X		
3. The Discovery Teaching Game (2)	X					X		X					X						X
4. Human Relations Training Unit (1,5,7,8,10--particularly oriented toward inner city)		X	X	X						X	X	X						X	X
5. Information Units (11)		X	X	X		X		X			X			X		X	X		
6. Inner-City Simulation Laboratory (1,2,3,4,5,7,8,10)	X		X	X		X							X	X				X	X
7. Professional Decision-making for Teachers (1,2,3,6,8,10)	X	X		X		X							X					X	
8. RUPS: Research Utilizing Problem-Solving (7,8)				X		X	X						X					X	

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STUDENT DIAGNOSIS AND EVALUATION

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Classroom Behavior Analysis and Treatment		x	x		x	x	x						x					x	
2. Competencies in Mathematics-"Assessing Student Behavior"		x	x		x	x								x		x			
3. Competencies in Mathematics-"Diagnosing Student Difficulties"		x	x		x		x							x		x			
4. Developing Effective Instruction --Criterion Tests --Determining Entry Level --Entry Level --Tests -Validation	x					x								x		x			
5. Development of Higher Level Thinking Abilities --Concept Diagnosis		x			x		x				x	x	x					x	
6. Films on Cognitive Development		x		x	x	x								x				x	x
7. Teaching in IPI Mathematics --Vol. 3: Diagnosing Student Achievement --Vols. 4,5,6: Developing Prescriptions--Three Cases	x					x								x		x			
8. Team Teaching Modules --Module VI: Evaluation of Team Teaching and Children's Continuous Progress, Team Teaching Modules				x		x								x		x			
9. Using Tests Intelligently	x					x								x					x

Content Areas	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Competencies in Mathematics					x	x									x	x			
2. Development of Higher Level Thinking Abilities --Social Studies		x			x			x			x	x	x					x	
3. Distar Series: Training Teachers and Paraprofessionals in Englemann-Becker Follow-Through Classrooms --Reading --Language --Mathematics		x	x	x		x	x				x	x	x					x	
4. Facilitating Inquiry in the Classroom (Science)					x		x						x					x	
5. Introduction to Early Childhood Education: A Laboratory-Workbook			x		x	x		x					x			x	x		
6. Minicourse on Individualizing Instruction in Mathematics					x	x	x				x		x			x			
7. Minicourse on Thought and Language: Skills for Teaching the Child with Minimal Language Development					x	x	x				x		x			x			
8. Social Studies Modules, Making a Living		x	x	x		x									x	x		x	
9. Teaching in IPI Mathematics	x					x									x	x			
10. The Teaching of Science: A Self-Directed Learning Program	x						x					x			x	x		x	

Psychology (Educational Psychology, Child Development)

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Groun)	Instructor	Coordinator
1. Critical Moments in Teaching and Guide for Independent Discussion and Study		x	x		x	x							x				x		
2. Distar Series: Training Teachers and Paraprofessionals in Englemann-Becker Follow-Through Classrooms		x		x	x	x	x					x	x	x				x	
3. Films on Cognitive Development		x		x	x	x								x			x	x	
4. Intellectual Development of Babies		x	x		x	x								x		x		x	
5. Modifying Classroom Behavior		x			x	x									x	x			
6. Teaching Achievement Motivation	x							x			x	x		x			x		
7. Using Tests Intelligently	x					x						x							x
8. The Psychology of Learning and Instruction: Educational Psychology					x	x						x		x		x	x		

MEDIA AND INSTRUCTIONAL TECHNOLOGY

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Cameras in Education		x	x		x		x							x				x	
2. Developing Effective Instruction --Development and administration of programmed materials	x					x								x		x			

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	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Professional Decision-Making for Teachers		x	x		x	x							x				x		
2. Team Teaching Modules					x	x									x	x			

STAFF DEVELOPMENT

Categories:
1. General Interpersonal Skills
2. Supervisory Skills

	Behavioral Status					Objectives					Instructional Format					Administration			
	Complete	Need specif. of obj.	Need Assessm. Meas.	A.M. need refining	Need Level of Perf.	Cognitive	Demonstrative	Consequential	Expressive	Affective-Psych	Micro-Teaching	Simu. Teaching/Roleplay	Group Discussion	Observ-Writing	Reading-Writing	Self-Ad (Indiv)	Self-Ad (Group)	Instructor	Coordinator
1. Analysis of Teaching Behavior (2)		x	x		x	x					x	x						x	
2. The Assessment Training Kit	x		x	x		x								x		x			
3. Classroom Behavior Analysis and Treatment (2)	x	x		x		x	x							x				x	
4. Discovering New Dimensions in the Teaching Process	x		x			x	x				x			x		x		x	
5. Guided Self-Analysis: Teaching for Inquiry (2)	x		x				x				x			x					x
6. Interaction Analysis (2)			x				x						x						x
7. Interpersonal Communications (1)			x			x	x						x				x		
8. Learning Interaction Analysis: A Programmed Approach (2)	x		x			x								x		x			
9. Systematic and Objective Analysis of Instruction (2)			x			x	x				x	x	x	x					x

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